

## **Peer-Reviewed Evidence of Persistence of Lyme Disease Spirochete *Borrelia burgdorferi* and Tick-Borne Diseases**

The following is a list of over 700 peer-reviewed articles that support the evidence of persistence of Lyme and other tick-borne diseases. It is organized into different categories—general, neuropsychiatric, dementia and congenital transmission.

### **General: Persistence of Lyme Disease Spirochete *Borrelia burgdorferi***

1. Abele DC, Anders KH. The many faces and phases of borreliosis. *J Am Acad Dermatol* 1990; 23:401-410. [chronic Lyme borreliosis].
2. Aberer E, Klade H. Cutaneous manifestations of Lyme borreliosis. *Infection* 1991; 19: 284-286. [chronic Lyme borreliosis].
3. Aberer E, Breier F, Stanek G, and Schmidt B. Success and failure in the treatment of acrodermatitis chronica atrophicans skin rash. *Infection* 1996; 24: 85-87.
4. Aberer E, Kersten A, Klade H, Poitschek C, Jurecka W. Heterogeneity of *Borrelia burgdorferi* in the skin. *Am J Dermatopathol* 1996; 18(6): 571-519.
5. Akin E, McHugh GI, Flavell RA, Fikrig E, Steere AC. The immunoglobulin (IgG) antibody response to OspA and OspB correlates with severe and prolonged Lyme arthritis and the IgG response to P35 with mild and brief arthritis. *Infect Immun* 1999; 67: 173-181.
6. Albert S, Schulze J, Riegel H, Brade V. Lyme arthritis in a 12-year-old patient after a latency period of 5 years. *Infection* 1999; 27(4-5): 286-288.
7. Allred DR. Babesiosis: persistence in the face of adversity. *Trends Parasitol.* 2003;19:51–55.
8. Al-Robaiy S, Dihazi H, Kacza J, et al. Metamorphosis of *Borrelia burgdorferi* organisms—RNA, lipid and protein composition in context with the spirochete’s shape. *J Basic Microbiol* 2010; 50 (Suppl 1): S5-17.
9. Appel MJG, Allan S, Jacobson RH, Lauderdale TL, Chang YF, Shin SJ, Thomford JW, Todhunter RJ, Summers BA. Experimental Lyme disease in dogs produces arthritis and persistent infection. *J Infect Dis* 1993; 167: 651-664.
10. Åsbrink E, Hovmark A. Successful cultivation of spirochetes from skin lesions of patients with erythema chronicum migrans, Afzelius and acrodermatitis chronica atrophicans. *Acta Pathol Microbiol Immunol Sect B* 1985; 93: 161-163.
11. Åsbrink E, Hovmark A, and Olsson I. Clinical manifestations of acrodermatitis chronica atrophicans in 50 Swedish patients. *Zentralbl Bakteriol Mikrobiol Hyg A* 1986; 26: 253-261. [chronic Lyme borreliosis].
12. Asch ES, Bujak DI, Weiss M, Peterson MGE, and Weinstein A. Lyme Disease: an infectious and postinfectious syndrome. *J Rheumatol* 1994; 21 (3): 451-461.
13. Bankhead T, Chaconas G. The role of VlsE antigenic variation in the Lyme disease spirochete: persistence through a mechanism that differs from other pathogens. *Molecular Microbiology* 2007; 65: 1547-1558.
14. Barthold SW, Persing DH, Armstrong AL, Peeples RA. Kinetics of *Borrelia burgdorferi* dissemination and evolution of disease following intradermal inoculation of mice. *Am J Pathol* 1991; 139: 263-273.
15. Barthold SW, deSouza MS, Janotka JL, Smith AL, Persing DH. Chronic Lyme borreliosis in the laboratory mouse. *Am J Pathol* 1993; 143: 951-971.
16. Barthold SW, Hodzic E, Imai DM, Feng S, Yang X, and Luft BJ. Ineffectiveness of tigecycline against persistent *Borrelia burgdorferi*. *Antimicrob Agents Chemother* 2010; 54(2): 643-651.

17. Barthold SW. Global challenges in diagnosing and managing Lyme disease—closing knowledge gaps. Testimony before House Committee on Foreign Affairs, United States Congress, 17 July 2012. Transcript available at: <http://archives.republicans.foreignaffairs.house.gov/112/75161.pdf>
18. Battafarano DF, Combs JA, Enzenauer RJ, Fitzpatrick JE. Chronic septic arthritis caused by *Borrelia burgdorferi*. *Clin Orthop* 1993;297: 238-241.
19. Baum E, Hue F, Barbour AG. Experimental infections of the reservoir species *Peromyscus leuopus* with diverse strains of *Borrelia burgdorferi*, a Lyme disease agent. *Mbio*. 2012;3: e00434-12.
20. Bayer ME, Zhang L, Bayer MH. *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.
21. Bentas W, Karch H, Huppertz HI. Lyme arthritis in children and adolescents: outcome 12 months after initiation of antibiotic therapy. *J Rheumatol*. 2000 Aug;27(8):2025-30.
22. Berger TG, Schoerner C, Schell H, Simon M, Schuler G, Röllinghoff M, Gessner A. Two unusual cases of diffuse acrodermatitis chronica atrophicans seronegative for Lyme borreliosis. *Eur J Clin Microbiol Infect Dis*. 2003 Jun;22(6):392-5.
23. Bergler-Klein J, Ullrich R, Glogar D, Stanek G. [Lyme borreliosis and cardiomyopathy]. *Wien Med Wochenschr*. 1995;145(7-8):196-8.
24. Berglund J, Stjernberg L, Ornstein K, Tykesson-Joelsson K, Walter H. 5-y follow-up study of patients with neuroborreliosis. *Scand. J. Infect. Dis*. 2002; 34(6): 421-425.
25. Berndtson K. Review of evidence for immune evasion and persistent infection in Lyme disease. *Int J of General Medicine* 2013; 6: 291-306. [Lyme disease spirochetes are adapted to persist in immune competent hosts; they are can remain infective despite aggressive antibiotic challenge.]
26. Bloom BJ, Wyckoff PM, Meissner HC, Steere AC. Neurocognitive abnormalities in children after classic manifestations of Lyme disease. *Pediatric Infect. Dis. J*. 1998; 17(3): 189-196.
27. Bradley JF, Johnson RC, Goodman JL. The persistence of spirochetal nucleic acids in active Lyme arthritis. *Ann Intern Med* 1994;120: 487-489.
28. Bransfield R, Brand S, and Sherr V. Treatment of patients with persistent symptoms and a history of Lyme disease. *N Engl Med* 2001; 345: 1424-5.
29. Breier F, Khanakah G, Stanek G, Aberer E, Schmidt B, and Tappeiner G. 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.
30. Bockenstedt LK, Mao J, Hodzic E, Barthold SW, Fish D. Detection of attenuated, non-infectious spirochetes in *Borrelia burgdorferi*-infected mice after antibiotic treatment. *J Infect Dis* 2002; 186: 1430-1437.
31. Bockenstedt LK, Gonzalez DG, Hamberman AM, Belperron A. Spirochete antigens persist near cartilage after murine Lyme borreliosis therapy. *J Clin Invest* 2012;122: 2652-2660.
32. Breier F, Kkhkanakah G, Stanek G, Kunz G, Aberer E, Schmidt B, Tappeiner G. Isolation and polymerase chain reaction 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.
33. Brorson O, Brorson S-H. Transformation of cystic forms of *Borrelia burgdorferi* to normal mobile spirochetes. *Infection*. 1997; 25: 240-246.
34. Brorson O, Brorson S. In vitro conversion of *Borrelia burgdorferi* to cystic forms in spinal fluid, and transformation to mobile spirochetes by incubation in BSK-H medium. *Infection*. 1998; 26: 144-150.

35. Brorson O, Brorson SH. An in vitro study of the susceptibility of mobile and cystic forms of *Borrelia burgdorferi* to metronidazole. *APMIS* 1999; 107: 566-576.
36. Brorson O, Brorson SH. An in vitro study of the susceptibility of mobile and cystic forms of *Borrelia burgdorferi* to tinidazole. *Int Microbiol* 2004; 7: 139-142.
37. Brorson O, Brorson SH. An in vitro study of the activity of telithromycin against mobile and cystic forms of *Borrelia afzelii*. *Infection* 2006; 34: 26-28.
38. Brorson O, Brorson SH, Scythes J, MacAllister J, Wier A, and Margulis L. Destruction of spirochete *Borrelia burgdorferi* round-body propagules by the antibiotic tigecycline. *Proc Natl Acad Sci USA* 2009; 106: 18656-61
39. Brown JP, Zachary JF, Teuscher C, Weis JJ, and Wooten M. Dual role of interleukin-10 in murine Lyme disease: regulation of arthritis severity and host defense. *Infect Immun* 1999; 67: 5142-5150.
40. Cabello FC, Godfrey HP, and Newman SA. Hidden in plain sight: *Borrelia burgdorferi* and the extracellular matrix. *Trends in Microbiology* 2007; 15: 350-354.
41. Cadavid D, O'Neill T, Schaefer H, and Pachner AR. Localization of *Borrelia burgdorferi* in the nervous system and organs in a nonhuman primate model of Lyme disease. *Lab Invest* 2000; 80: 1043-1054.
42. Cadavid D, Bai Y, Hodzic E, Narayan K, Barthold SW, Pachner AR. Cardiac involvement in non-human primates infected with the Lyme disease spirochete *Borrelia burgdorferi*. *Lab Invest* 2004; 84: 1439-1450.
43. Cameron D, Gaito A, Harris N et al. Evidence-based guidelines for the management of Lyme disease. *Expert Rev Anti-Infect. Ther* 2004; 2 (Suppl. 1), S1-S13.
44. Cameron DJ. Generalizability in two clinic trials of Lyme disease. *Epidemiol Perspect Innov.* 2006 Oct 17;3:12.
45. Cameron D. Severity of Lyme disease with persistent symptoms. Insights from a double-blind placebo-controlled clinical trial. *Minerva Med* 2008; 99: 489-496.
46. Cameron DJ. Insufficient evidence to deny antibiotic treatment to chronic Lyme disease patients. *Med Hypotheses* 2009 Jun;72(6):688-91.
47. Cameron DJ. Proof that chronic Lyme disease exists. *Interdiscip Perspect Infect Dis.* 2010;2010:876450.
48. Chancellor MB, McGinnis DE, Shenot PJ, Kiilholma P, Hirsch IH. Urinary dysfunction in Lyme disease. *J Urol* 1993; 149: 26-30.
49. Chang YK, Ku YW, Chang CF, Chang CD, McDonough SP, Divers T, Pough M, Torres A. Antibiotic treatment of experimentally *Borrelia burgdorferi*-infected ponies. *Vet Microbiol* 2005; 107: 285-294.
50. Chao L-L, Lu C-F, and Shih C-M. Molecular detection and genetic identification of *Borrelia garinii* and *Borrelia afzelii* from patients presenting with a rare skin manifestation of prurigo pigmentosa in Taiwan. *Int J Infect Dis* 2013 Dec;17(12):e1141-7.
51. Chakravarty KK, Webley M, Summers GD. A case of chronic Lyme arthritis in England. *Ann Rheum Dis.* 1991 Feb;50(2):134-5.
52. Chary-Valckenaere I, Jaulhac B, Champigneulle J, Piement Y, Mainard D, and Pourel J. Ultrastructural demonstration of intracellular localization of *Borrelia burgdorferi* in Lyme arthritis. *Br J Rheumatol* 1998; 37: 468-470.
53. Chmielewski T, Tylewska-Wierzhanowska S. Inhibition of fibroblast apoptosis by *Borrelia afzelii*, *Coxiella burnetii* and *Bartonella henselae*. *Poll Microbiol* 2011; 60(3); 269-272.
54. Chomel BB, Kasten RW, Sykes JE, Boulouis HJ, Breitschwerdt EB. Clinical impact of persistent *Bartonella* bacteremia in humans and animals. *Ann N Y Acad Sci.* 2003;990:267-278.
55. Cimmino MA, Azzolini A, Tobia F, Pesce CM. Spirochetes in the spleen of a patient

- with chronic Lyme disease. *Am J Clin Pathol* 1989; 91(1): 95-97.
56. Clarke AE, Esdaile JM, Bloch DA, Lacaille D, Danoff, and Fries JF. A Canadian study of the total medical costs for patients with systemic lupus erythema and the predictors of costs. *Arthritis Rheum.* 1993; 36(11): 1548-1593.
  57. Coblyn JS, Taylor P. Treatment of chronic Lyme arthritis with hydroxychloroquine. *Arthritis Rheum.* 1981 Dec;24(12):1567-9.
  58. Collares-Pereira M, Couceiro S, Franca I, Kurtenbach K, Schäfer SM, Vitorino L, Gonçalves L, Baptista S, Vieira ML, Cunha C. First isolation of *Borrelia lusitaniae* from a human patient. *J Clin Microbiol.* 2004 Mar;42(3):1316-8.
  59. Craft J, Fischer DK, Shimamoto GT, Steere AC. Antigens of *Borrelia burgdorferi* recognized during Lyme disease appearance of a new immunoglobulin M response and expansion of the immunoglobulin G response late in the illness. *J. Clin. Invest.* 1986; 78:934-939.
  60. Dattwyler RJ, Volkman DJ, Luft BJ, Halperin JJ, Thomas J, Golightly MG. Seronegative Lyme disease. Dissociation of specific T- and B-lymphocyte response to *Borrelia burgdorferi*. *N Engl J Med* 1988; 319(22): 1441-1446.
  61. Dejmková H, D Hulinska, D Tegezová, K Pavelka, J Gatterová, and P Vavřík. Seronegative Lyme arthritis caused by *Borrelia garinii*. *Clin Rheumatol* 2002; 21:330-334.
  62. de Koning J, et al. Demonstration of spirochetes in cardiac biopsies of patients with Lyme disease. *J. Infect. Dis.* 1989; 160: 150-153. [intracellular sanctuaries of Bb]
  63. de Leeuw BH, Maraha B, Hollemans L, Sprong H, Brandenburg AH, Westenend PJ, Kusters JG. Evaluation of *Borrelia* real time PCR DNA targeting *OspA*, *FlaB* and 5S-23S IGS and *Borrelia* 16S rRNA-qPCR. *J Microbiol Methods* 2014 Dec;107:41-6.
  64. de Souza MS, Smith AL, Beck DS, Terwilliger GA, Fikrig E, Barthold SW. Long-term study of cell-mediated responses to *Borrelia burgdorferi* in the laboratory mouse. *Infect Immun.* 1993 May;61(5):1814-22.
  65. DeLong AK, Blossom B, Maloney E, and Phillips SE. Antibiotic retreatment of Lyme disease in patients with persistent symptoms: A biostatistical review of randomized, placebo-controlled, clinical trials. *Contemp Clin Trials* 2012 Nov;33(6):1132-42.
  66. Demaerschalck I, Messaoud AB, de Kesel M, Hoyois B, Lobet Y, Hoet P, Bigaignon G, Bollen A, Godfroid E. Simultaneous presence of different *Borrelia burgdorferi* genospecies in biological fluids of Lyme disease patients. *J Clin Microbiol* 1995; 33: 602-608.
  67. Dinerman H, Steere AC. Lyme disease associated with fibromyalgia. *Ann Intern Med.* 1992 Aug 15;117(4):281-5.
  68. Diterich I, Rauter C, Kirschning CJ, and Hartung T. *Borrelia burgdorferi*-induced tolerance as a model of persistence via immunosuppression. *Infect Immun.* 2003; 71(7):3979-3987.
  69. Donahue JG, Piesman J, Spielman A. Reservoir competence of white-footed mice for Lyme disease spirochetes. *Am J Trop Med Hyg.* 1987;36: 92-96.
  70. Donta ST. Tetracycline therapy for chronic Lyme disease. *Clin Inf Dis.* 1997; 25 (Suppl 1); S52-56.
  71. Donta ST. The existence of chronic Lyme disease. *Curr Treat Op Infect Dis.* 2001; 3: 261-262.
  72. Donta ST. Late and chronic Lyme disease. *Med Clin North Am.* 2002; 86: 341-349.
  73. Donta ST. Macrolide therapy of chronic Lyme disease. *Med Sci Monit.* 2003; 9: 136-142.
  74. Dorward DW, Fischer ER, and Brooks DM. Invasion and cytopathic killing of human lymphocytes by spirochetes causing Lyme disease. *Clin. Infect. Dis.* 1997. 25 Suppl 1: S2-8. [intracellular sanctuaries of Bb]
  75. Dumler JS, Bakken JS. Human granulocytic ehrlichiosis in Wisconsin and Minnesota: a

- frequent infection with the potential for persistence. *J Infect Dis.* 1996;173:1027-1030.
76. Dunham-Ems SM, Caimano MJ, Pal U, et al. Live imaging reveals a biphasic mode of dissemination of *Borrelia burgdorferi* within ticks. *J Clin Invest.* 2009; 119: 3652-3665.
  77. Duray PH and Johnson RC. The histopathology of experimentally infected hamsters with the Lyme disease spirochete, *Borrelia burgdorferi*. *Proc Soc Exp Biol Med* 1986; 181: 263-269.
  78. Duray PH. The surgical pathology of human Lyme disease. An enlarging picture. *Am J Surg Pathol* 1987; 11 (Suppl 1):47-60.
  79. Duray PH, Steere AC. Clinical pathologic correlations of Lyme disease by stage. *Ann N Y Acad Sci* 1988; 539: 65-79.
  80. Duray PH, et al. Invasion of human tissue ex vivo by *Borrelia burgdorferi*. *J Infect Dis.* 2005; 191(10): 1747-1754.
  81. Durovska J, Bazovska S, Ondrisova M, and Pancak J. 2010. Our experience with examination of antibodies against antigens of *Borrelia burgdorferi* in patients with suspected Lyme disease. *Bratist. Lek. Listy* 2010; 111(3): 153-155.
  82. Dvorakova J, and Celer V. Pharmacological aspects of Lyme borreliosis. *Seska Slov Farm.* 2004(Jul); 53(4): 159-164.
  83. Ebel GD, Campbell EN, Goethert HK, Spielman A, and Telford SR. Enzootic transmission of deer tick virus in New England and Wisconsin sites. *Am J Trop Med Hyg.* 2000; 63(1-2): 36-42.
  84. Ekdahl KN, Henningsson AJ, Sandholm K, Forsberg P, Ernerudh J, Ekerfelt C. Immunity in borreliosis with special emphasis on the role of complement. *Adv Exp Med Biol* 2007; 598: 198-213.
  85. Embers ME, SW Barthold, JT Borda, et al. Persistence of *Borrelia burgdorferi* in rhesus macaques following antibiotic treatment of disseminated infection. *PLoS ONE* 2012;7(1): e29914.
  86. Embers ME, Ramamoorthy R, Philipp MT. Survival strategies of *Borrelia burgdorferi*, the etiologic agent of Lyme disease. *Microbes Infect.* 2004 Mar;6(3):312-8. Review.
  87. Eng TR, Harkess JR, Fishbein DB, Dawson JE, Greene CN, Redus MA, Satalowich FT. Epidemiologic, clinical, and laboratory findings of human ehrlichiosis in the United States, 1988. *JAMA* 1990 Nov 7;264(17):2251-8.
  88. Fallon BA, et al. Repeated antibiotic treatment in chronic Lyme disease. *J Spiro Tick Borne Dis.* 1999; 6: 94-101.
  89. Feder Jr., HM and Whitaker DL. Misdiagnosis of erythema migrans. *Am J Med.* 1995; 99: 412-419.
  90. Fein L, Tilton RC. Bone marrow as a source for *Borrelia burgdorferi* DNA. *J Spiro Tick-borne Dis.* 1997; 4: 58-60.
  91. Feng J, Shi W, Zhang S, Zhang Y. Persister mechanisms in *Borrelia burgdorferi*: implications for improved intervention. *Emerg Microbes Infect.* 2015 Aug;4(8):e51.
  92. Ferris J, et al. Lyme borreliosis. *Lancet* 1995; 345: 1436-1437.
  93. Ferrís i Tortajada J, López-Andreu JA, Salcedo-Vivó J, Sala-Lizárraga JV. Relapsing neuroborreliosis. *Eur Neurol.* 1996;36(6):394-5.
  94. Franz JK, O Fritze, M Rittig et al. Insights from a novel three-dimensional in vitro model of Lyme arthritis: standardized analysis of cellular and molecular interactions between *Borrelia burgdorferi* and synovial explants and fibroblasts. *Arthritis Rheum* 2001; 44: 151-162.
  95. Fraser DD, Kong LI, and Miller FW. Molecular detection of persistent *Borrelia burgdorferi* in a man with dermatomyositis. *Clin Exp Rheumatol* 1992; 10: 387-390.
  96. Frey M, Jaulhac B, Piemont Y, Marcellin L, Boohs PM, Vautravers P, Jesel M, Kuntz JL, Monteil H, and Sibilía J. Detection of *Borrelia burgdorferi* DNA in muscle of patients

- with chronic myalgia related to Lyme disease. *Am J Med* 1988; 104: 591-594.
97. Gaito A, Gjivoje V, Lutz S, II, and Baxter B, II. Comparative analysis of the infectivity rate of both *Borrelia burgdorferi* and *Anaplasma phagocytophilum* in humans and dogs in a New Jersey community. *Infect. Drug Resist.* 2014; 7: 199-201. [persistence of Bb in humans and dogs]
  98. Garbe C, Stein H, Dienemann D, Orfanos CE. *Borrelia burgdorferi*-associated cutaneous B cell lymphoma: clinical and immunohistologic characterization of four cases. *J Am Acad Dermatol.* 1991 Apr;24(4):584-90.
  99. Garcia-Monco JC, Benach JL. The pathogenesis of Lyme disease. *Rheum Dis Clin North Am.* 1989; 15: 711-726.
  100. Gasser R, Horn S, Reisinger E, Fischer L, Pokan R, Wendelin I, Klein W. First description of recurrent pericardial effusion associated with *borrelia burgdorferi* infection. *Int J Cardiol.* 1998 May 15;64(3):309-10.
  101. Gellis SE, Stadecker MJ, Steere AC. Spirochetes in atrophic skin lesions accompanied by minimal host response in a child with Lyme disease. *J Am Acad Dermatol.* 1991 Aug;25(2 Pt 2):395-7.
  102. Georgilis K, Peacocke M, and Klempner MS. Fibroblasts protect the Lyme disease spirochete, *Borrelia burgdorferi*, from ceftriaxone in vitro. *J Infect Dis* 1992; 166: 440-444.
  103. Giambartolomei GH, Dennis VA, and Philipp MT. *Borrelia burgdorferi* stimulates the production of interleukin-10 in peripheral blood mononuclear cells from uninfected humans and rhesus monkeys. *Infect Immun* 1998; 66: 2691-2697. [suppression of harmful immune responses: defense stratagem of *B. burgdorferi*]
  104. Girschick HJ, Huppertz HI, Rüssmann H, Krenn V, and Karch H. Intracellular persistence of *Borrelia burgdorferi* in human synovial cells. *Rheumatol Int.* 1996; 16: 125-132. [intracellular sanctuaries of Bb]
  105. Goodman JL, Jurkovich P, Kodner C, and Johnson RC. Persistent cardiac and urinary tract infections with *Borrelia burgdorferi* in experimentally infected Syrian hamsters. *J Clin Microbiol* 1991; 29: 894-896. [hamsters]
  106. Grignolo MC, Buffrini L, Monteforte P, and Rovetta G. Reliability of a polymerase chain reaction (PCR) technique in the diagnosis of Lyme borreliosis. *Minerva Med* 2001; 92(1): 29-33.
  107. Gruntar I, et al. Conversion of *Borrelia garinii* cystic forms to motile spirochetes in vivo. *APMIS* 2001; 109(5): 383-388.
  108. Hamlen R. Tick-borne infections--a growing public health threat to school-age children. Prevention steps that school personnel can take. *NASN School Nurse* 2012(Mar); 27(2): 94-100.
  109. Hamlen RA, Kliman DS. Pediatric Lyme disease--A school issue: Tips for school nurses. *NASN School Nurse* 2009; 24; 114 .
  110. Harrus S, Waner T, Aizenberg I, Foley JE, Poland AM, Bark H. Amplification of ehrlichial DNA from dogs 34 months after infection with *Ehrlichia canis*. *J Clin Microbiol.* 1998;36:73-76.
  111. Harvey WT, Bransfield RC, Mercer DE, Wright AJ, Ricchi RM, Leitao MM. Morgellons disease, illuminating an undefined illness: a case series. *J Med Case Rep* 2009; 3:8243 .
  112. Hassler D, Riedel K, Zorn J, Preac-Mursic V. Pulsed high-dose cefotaxime therapy in refractory Lyme borreliosis. *Lancet* 1991; 338: 193.
  113. Hastey CJ, Elsner RA, Barthold SW, Baumgarth N. Delays and diversions mark the development of B cell responses to *Borrelia burgdorferi* infection. *J Immunol.* 2012 Jun 1;188(11):5612-22.

114. Häupl T, Hahn G, Rittig M, Krause A, Schoerner C, Schönherr U, Kalden JR, Burmester GR. Persistence of *Borrelia burgdorferi* in ligamentous tissue from a patient with chronic Lyme borreliosis. *Arthritis Rheum.* 1993 Nov;36(11):1621-6.
115. Henneberg JP, and Neubert U. *Borrelia burgdorferi* group: in vitro antibiotic sensitivity. *Orv Hetil* 2002; 143: 1195-1198.
116. Hefty PS, Brooks CS, Jett AM, White GL, Wikel SK, et al. OspE-related, OspF-related, and Elp lipoproteins are immunogenic in baboons experimentally infected with *Borrelia burgdorferi* and in human Lyme disease patients. *J Clin Microbiol* 2002;40: 4256-4265.
117. Hilton E, Tramontano A, DeVoti J, and Sood SK. Temporal study of immunoglobulin M seroreactivity to *Borrelia burgdorferi* in patients treated for Lyme borreliosis. *J Clin Microbiol* 1997; 35(3): 774-776.
118. Hodzic E, Feng S, Barthold SW. Stability of *Borrelia burgdorferi* outer surface protein C under immune selection pressure. *J Infect Dis.* 2000; 181: 750-753.
119. Hodzic E, Feng S, Holden K, Freet KJ, Barthold SW. Persistence of *Borrelia burgdorferi* following antibiotic treatment in mice. *Antimicrob Agents Chemother* 2008; 52: 1728-1736.
120. Holden K, Hodzic E, Feng S, Freet KJ, Lefebvre RB, Barthold SW. Coinfection with *Anaplasma phagocytophilum* alters *Borrelia burgdorferi* population distribution in C3H/HeN mice. *Infect Immun.* 2005 Jun;73(6):3440-4.
121. Holl-Weiden A, Suerbaum S, Girschick HJ. Seronegative Lyme arthritis. *Rheumatology International* 2007; 11: 1091-1093.
122. Honegr K, Hulinska D, Dostal V, Gebousky P, Hankova E, Horacek J, Vyslouzil L, Havlasova J. Persistence of *Borrelia burgdorferi sensu lato* in patients with Lyme borreliosis. *Epidemiol Mikrobiol Immunol.* 2001; 50: 10-16.
123. Huang CY, Chen YW, Kao TH, Kao HK, Lee YC, Cheng JC, Wang JH. Hyperbaric oxygen therapy as an effective adjunctive treatment for chronic Lyme disease. *J Chin Med Assoc.* 2014 May;77(5):269-71.
124. Hudson BJ, Stewart M, Lennox VA, Fukunaga M, Yabuki M, Macorison H, Kitchener-Smith J. Culture-positive Lyme borreliosis. *Med J Aust.* 1998; 168(10): 500-502.
125. Hulínská D, Krausova M, Janovská D, Roháčová H, Hancil J, Mailer H. Electron microscopy and the polymerase chain reaction of spirochetes from the blood of patients with Lyme disease. *Cent Eur J Public Health* 1993; 1(2): 81-85.
126. Hulinska D, Votypka J, and Valesova M. Persistence of *Borrelia garinii* and *Borrelia afzelii* in patients with Lyme arthritis. *Int J Med Microbiol Virol Parasitol Infect Dis* 1999; 289(3): 301-318.
127. Hunfeld KP, Ruzic-Sabljić E, Norris DE, Kraiczky P, and Strle F. In vitro susceptibility testing of *Borrelia burgdorferi sensu lato* isolates cultured from patients with erythema migrans before and after antimicrobial chemotherapy. *Antimicro Agents Chemother* 2005; 49: 1294-1301.
128. Johnson RC, Marek N, Kodner C. Infection of Syrian hamsters with Lyme disease spirochetes. *J. Clin. Microbiol.* 1984; 20: 1099-1101.
129. Johnson L, Stricker RB. Treatment of Lyme disease: a medicolegal assessment. *Expert Rev Anti-Infect Ther* 2004. 2: 533-557.
130. Kaiser R. Clinical courses of acute and chronic neuroborreliosis following treatment with ceftriaxone. *Nervenarzt.* 2004; 75(6): 553-557.
131. Kalish RA, Leong JM, and AC Steere. Association of treatment-resistant chronic Lyme arthritis with HLA-DR4 and antibody reactivity to OspA and OspB of *Borrelia burgdorferi*. *Infect Immun* 1993; 61: 2774-2779.
132. Kalish RA, McHugh G, Granquist J, Shea B, Ruthazer R, Steere AC. Persistence

- of immunoglobulin M or immunoglobulin G antibody responses to *Borrelia burgdorferi* 10-20 years after active Lyme disease. *Clin Infect Dis* 2001; 33: 780-785.
133. Karch H, Huppertz HI. Repeated detection of *Borrelia burgdorferi* DNA in synovial fluid of a child with Lyme arthritis. *Rheumatol Int*. 1993;12(6):227-9.
  134. Kaya G, Berset M, Prins C, Chavaz P, Saurat JH. Chronic borreliosis presenting with morphea- and lichen sclerosus et atrophicus-like cutaneous lesions. a case report. *Dermatology*. 2001;202(4):373-5
  135. Keat AC, and Hughes R. Infectious agents in reactive arthritis. *Curr Opin Rheumatol* 1993; 5: 414-419.
  136. Kersten A, Poitschek C, Rauch S, and Aberer E. Effects of penicillin, ceftriaxone, and doxycycline on morphology of *Borrelia burgdorferi*. *Antimicrob Agents Chemother* 1995; 39: 1127-1133.
  137. Keszler K, and Tilton RC. Persistent PCR positivity in a patient being treated for Lyme disease. *J Spiro Tick-Borne Dis* 1995; 2: 57-58.
  138. Kirsch M,, Ruben FL, Steere AC, Duray PH, Norden CW, Winkelstein A. Fatal adult respiratory distress syndrome in a patient with Lyme disease. *JAMA* 1988; 259(18) 2737-2739.
  139. Klemmner MS, Noring R, and Rogers RA. Invasion of human skin fibroblasts by the Lyme disease spirochetes, *Borrelia burgdorferi*. *J Infect Dis* 1993; 167: 1074-81.
  140. Klemann W, Huismans BD, and Heyl S. Prolonged antibiotic therapy in PCR persistent Lyme disease. Grin Verlag 2011. ISBN 978-3-640-82803-6
  141. Kraiczky P, Hellwage J, Skerka C, Becker H, Kirschfink M, Simon MM, et al. Complement resistance of *Borrelia burgdorferi* correlates with the expression of BbCRASP-1, a novel linear plasmid-encoded surface protein that interacts with human factor H and FHL-1 and is unrelated to Erp proteins. *J Biol Chem* 2004; 279: 2421-2429.
  142. Krause PJ, Spielman A, Telford SR, et al. Persistent parasitemia after acute babesiosis. *N Engl J Med*. 1998;339:160–165.
  143. Krause PJ, Telford SR 3rd, Spielman A, Sikand V, Ryan R, Christianson D, Burke G, Brassard P, Pollack R, Peck J, Persing DH. Concurrent Lyme disease and babesiosis. Evidence for increased severity and duration of illness. *JAMA*. 1996 Jun 5;275(21):1657-60.
  144. Kugeler KJ, Griffith KS, Gould LH et al. A review of death certificates listing Lyme disease as a cause of death in the United States. *Clin Infect Dis*. 2011; 52 (3): 364-367.
  145. Kullberg BJ, Berende A, van der Meer JW. The challenge of Lyme disease: tired of the Lyme wars. *Neth J Med* 2011; 69: 98-100.
  146. Lawrenz MB, Hardham JM, Owens RT, Nowakowski J, Steere AC, Wormser GP, Norris SJ. Human antibody responses to vlsE antigenic variation protein of *Borrelia burgdorferi*. *J Clin Microbiol* 1999; 37: 3997-4004.
  147. Lee SH, Vigliotti JS, Vigliotti VS, James W, Moorcroft TA, Lantsman K. DNA sequencing diagnosis of off-season spirochetemia with low bacterial density in *Borrelia burgdorferi* and *Borrelia miyamotoi* infections. *Int. J. Mol. Sci*. 2014; 15: 11364-11386.
  148. Leff RD, Akre SP. Late stage Lyme borreliosis in children. *South Med J*. 1989 Aug;82(8):954-6.
  149. Leverkus M, Finner AM, Pokrywka A, Franke I, Gollnick H. Metastatic squamous cell carcinoma of the ankle in long-standing untreated acrodermatitis chronica atrophicans. *Dermatology*. 2008;217(3):215-8.
  150. Levy E, Morruzzi C, Barbarini A, Sordet C, Cribier B, Jaulhac B, Lipsker D. Clinical images: toe dactylitis revealing late Lyme borreliosis. *Arthritis Rheum*. 2012 Apr;64(4):1293.
  151. Li X, HcHugh GA, Hamle N, Sikland VI, Glickstein L, et al. Burden and



- viability of *Borrelia burgdorferi* in skin and joints of patients with erythema migrans or Lyme arthritis. *Arthritis Rheum* 2011;63: 2238-2247. [humans]
152. Liang FT, Steere AC, Marques AR, Johnson BJB, Miller JN, and Philipp MT. Sensitive and specific serodiagnosis of Lyme disease by enzyme-linked immunosorbent assay with a peptide based on an immunodominant conserved region of *Borrelia burgdorferi* VlsE. *J Clin Microbiol* 1999; 37: 3990-3996.
  153. Liang FT, Jacobs MB, Bowers LC, Philipp MT. An immune evasion mechanism for spirochetal persistence in Lyme borreliosis. *J Exp Med* 2002; 195: 415-422.
  154. Liegner KB. Minocycline in Lyme disease. *J Am Acad Dermatol*. 1992 Feb;26(2 Pt 1):263-4.
  155. Liegner KB. Lyme disease: the sensible pursuit of answers. *J Clin Microbiol* 1993; 31: 1961-1963.
  156. Liegner KB, Shapiro JR, Ramsay D, Halperin AJ, Hogrefe W, Kong L. Recurrent erythema migrans despite extended antibiotic treatment with minocycline in a patient with persisting *Borrelia burgdorferi* infection. *J Am Acad Dermatol* 1993; 28: 312-314.
  157. Ljostad J, Mygland Å. Chronic Lyme: diagnostic and therapeutic challenges. *Acta Neurol Scand* 2013;196: 38-47.
  158. Logigian EL, Johnson KA, Kijewski MF, Kaplan RF, Becker JA, Jones KJ, Garada BM, Holman BL, Steere AC. Reversible cerebral hypoperfusion in Lyme encephalopathy. *Neurology* 1997; 49: 1661-1670.
  159. López-Andreu JA, Ferrís J, Canosa CA, Sala-Lizárraga JV. Treatment of late Lyme disease: a challenge to accept. *J Clin Microbiol* 1994; 32:1415-1416.
  160. Ma Y, Sturrock A, Weis JJ. Intracellular localization of *Borrelia burgdorferi* within human endothelial cells. *Infect Immun* 1991; 59: 671-678.
  161. MacDonald AB. Biofilms of *Borrelia burgdorferi* on chironic cutaneous borrelia. *Am J Clin Pathol* 2008; 129: 988-989.
  162. MacDonald, AB. *Borrelia burgdorferi* tissue morphologies and imaging methodologies. *Eur J Clin Microbiol Infect Dis* 2013; 32(8): 1077-82.
  163. MacDonald AB. A life cycle for *Borrelia spirochetes*? *Med Hypotheses*. 2006;67(4):810-8.
  164. Maggi RG, Ericson M, Mascarelli PE, Bradley JM, Breitschwerdt EB. *Bartonella henselae* bacteremia in a mother and son potentially associated with tick exposure *Parasites & Vectors* April 2013, 6:101.
  165. Mahmoud AAF. The challenge of intracellular pathogens (editorial). *N Engl J Med* 1992; 326: 761-762.
  166. Malane MS, Grant Kels JM, Feder Hm Jr. et al. Diagnosis of Lyme disease based on dermatologic manifestations. *Ann Intern Med* 1991; 114:490-498. [chronic Lyme borreliosis].
  167. Malawista SE, Barthold SW, and Persing DH. Fate of *Borrelia burgdorferi* DNA in tissues of infected mice after antibiotic treatment. *J Infect Dis* 1994; 170: 1312-1316.
  168. Malawista SE. Resolution of Lyme arthritis, acute or prolonged: a new look. *Inflammation*. 2000 Dec;24(6):493-504.
  169. Manak MK, González-Villaseñor LI, Crush-Stanton S, and Tilton RC. Use of PCR assays to monitor the clearance of *Borrelia burgdorferi* DNA from blood following antibiotic therapy. *J Spir Tick-Borne Dis* 1997; 4: 11-20.
  170. Maraspin V, Ruzic-Sabljić E, Strle F, Cimperman J, Jereb M, Preac-Mursic V. Persistence of *Borrelia burgdorferi* after treatment with antibiotics. *Alpe Adria Microbiol J*. 3: 211-216.
  171. Maraspin V, Cimperman J, Lotrič-Furlan S, Ružić-Sabljić E, Jurca T, Picken RN, Strle F. Solitary borrelial lymphocytoma in adult patients. *Wien Klin Wochenschr* 2002; 114: 515-523.

172. Marlovits S, Khanah G, Striessniq G, Vécsei V, and Stanek G. Emergence of Lyme arthritis after autologous chondrocyte transplantation. *Arthritis Rheum.* 2004; 50: 259-264.
173. Masters EJ, Lynxwiler P, and Rawlings J. Spirochetemia after continuous high-dose oral amoxicillin therapy. *Infect Dis Clin Practice* 1995; 3: 207-208.
174. Mayer W, Kleber FX, Wilske B, Preac-Mursic V, Maciejewski W, Sigl H, Holzer E, Doering W. Persistent atrioventricular block in Lyme borreliosis. *KlinWochenschr.* 1990 Apr 17;68(8):431-5.
175. McAlister HF, Klementowicz PT, Andrews C, Fisher JD, Feld M, Furman S. Lyme carditis: an important cause of reversible heart block. *Ann Intern Med.* 1989 Mar 1;110(5):339-45.
176. McLaughlin TP, Zemel L, Fisher RL, Gossling HR. Chronic arthritis of the knee in Lyme disease. Review of the literature and report of two cases treated by synovectomy. *J Bone Joint Surg Am.* 1986 Sep;68(7):1057-61.
177. Meier P, Blatz R, Gau M, Spencker FB, Wiedermann P. [Pars plana vitrectomy in *Borrelia burgdorferi* endophthalmitis][German]. *Klin Monatsbl Augenheilkd* 1998; 213(6): 351-354.
178. Middelveen MJ, Bandoski C, Burke J, et al. Exploring the association between Morgellons disease and Lyme disease: identification of *Borrelia burgdorferi* in Morgellons disease patients. *BMC Dermatol.* 2015;15:1.
179. Middelveen MJ, Stricker RB. Morgellons disease: a filamentous borrelial dermatitis. *Int J Gen Med* 2016;9 349–354
180. Middelveen, MJ, McClain SA, Bandoski C, Israel JR, Burke J, MacDonald AB, Sapi E, Wang Y, Franco A, Mayne PJ, Stricker RB. Granulomatous hepatitis associated with chronic *Borrelia burgdorferi* infection: a case report. *Research* 2014; 1: 875. <http://dx.doi.org/10.130070/rs.en.1.875>.
181. Miller JC, K Narayan, B Stevenson, and AR Pachner. Expression of *Borrelia burgdorferi* *erp* genes during infection of non-human primates. *Microb Pathol.* 2005; 39: 27-33. [in monkeys]
182. Montgomery RR, Nathanson MH, Malawista SE. The fate of *Borrelia burgdorferi* within endothelial cells. *Infect Immun* 1991; 59: 671-678.
183. Montgomery RR, Nathanson MH, Malawista SE. The fate of *Borrelia burgdorferi*, the agent for Lyme disease, in mouse macrophages. Destruction, survival, recovery. *J Immunol* 1993; 150: 909-915.
184. Moody KD, Barthold SW, Terwilliger GA. Lyme borreliosis in laboratory animals: effect of host species and into passage of *Borrelia burgdorferi*. *Am J Trop Med Hyg* 1990; 43: 87-92.
185. Moody KD, Barthold SW, Terwilliger GA, Beck DS, Hansen GM, et al. Experimental chronic Lyme borreliosis in Lewis rats. *Am J Trop Med Hyg* 1990;42: 65-74.
186. Moody KD, Adams RL, and Barthold SW. Effectiveness of antimicrobial treatment against *Borrelia burgdorferi* infection in mice. *Anticomb Agents Chemother* 1994; 38: 1567-1572.
187. Moriarty TJ, Norman MU, Colarusso P, Bankhead T, Kubes P, and Chaconas G. Real-time high resolution 3D imaging of the Lyme disease spirochete adhering to and escaping from the vasculature of a living host. *PLoS Pathog.* 2008; 4(6):e1000090.
188. Müllegger RR, Glatz M. Skin manifestations of Lyme borreliosis: diagnosis and management. *Am J Clin Dermatol.* 2008;9(6):355-68.
189. Müller KE. Damage of collagen and elastic fibres by *Borrelia burgdorferi*—known and new clinical and histopathological aspects. *Open Neurol J.* 2012; 6: 179-186.
190. Mursic VP, Wanner G, Reinhardt S, Wilske B, Busch U, Marget W. Formation

- and cultivation of *Borrelia burgdorferi* spheroplast L-form variants. *Infection* 1996; 24(4): 335.
191. Nanagara R, Duray PH, and Schumacher HR, Jr. Ultrastructural demonstration of spirochetal antigens in synovial fluid and synovial membrane in chronic Lyme disease: possible factors contributing to persistence of organisms. *Hum Pathol* 1996; 27(10): 1025-1034.
  192. Nocton JJ, Dressler F, Rutledge BJ, Rys PN, Persing DH, Steere AC. Detection of *Borrelia burgdorferi* DNA by polymerase chain reaction in synovial fluid from patients with Lyme arthritis. *N Eng J Med* 1994; 330: 229-234.
  193. Norgard MV, Riley BS, Richardson JA, et al. 1995. Dermal inflammation elicited by synthetic analogs of *Treponema pallidum* and *Borrelia burgdorferi* lipoproteins. *Infect Immun* 63: 1507-1515.
  194. Oksi J, Voipio-Pulkki LM, Uksila J, Pulkki K, Laippala P, Viljanen MK. *Borrelia burgdorferi* infection in patients with suspected acute myocardial infarction. *Lancet*. 1997 Nov 15;350:1447-8.
  195. Oksi J, Mertsola J, Reunanen M, Marjamäki M, Viljanen MK. Subacute multiple-site osteomyelitis caused by *Borrelia burgdorferi*. *Clin Infect Dis* 1994; 19(5): 891-896.
  196. Oksi J, Uksila J, Marjamäki M, Nikoskelainen J, Viljanen MK. Antibodies against whole sonicated *Borrelia burgdorferi* spirochetes, 41-kilodalton flagellin, and P39 protein in patients with PCR- or culture-proven late Lyme borreliosis. *J Clin Microbiol* 1995; 33: 2260-2264.
  197. Oksi J, Nikoskelainen J, Viljanen MK. Comparison of oral cefixime and intravenous ceftriaxone followed by oral amoxicillin in disseminated Lyme borreliosis. *Eur J Clin Microbiol Int Dis* 1998; 17: 715-719.
  198. Oksi J, Marjamäki M, Nikoskelainen J, Viljanen MK. *Borrelia burgdorferi* detected by culture and PCR in clinical relapse of disseminated Lyme borreliosis. *Ann Med* 1999; 31(3): 225-232. [40% of patients had clinical relapses that were PCR or culture-confirmed.]
  199. Pachner AR, Delaney E, and O'Neill T. Neuroborreliosis in the nonhuman primate: *Borrelia burgdorferi* persists in the central nervous system. *Ann Neurol* 1995; 38: 667-9.
  200. Pachner AR, J Basta, E Delaney, D Hulinska. Localization of *Borrelia burgdorferi* in murine Lyme borreliosis by electron microscopy. *Am J Trop Med Hyg* 1995; 52: 128-133.
  201. Pachner AR, Cadavid D, Shu G, Dail D, Pachner S, Hodzic E, Barthold SW. Central and peripheral nervous system infection, immunity, and inflammation in the NHP model of Lyme borreliosis. *Ann Neurol* 2001; 50: 330-338. [in monkeys]
  202. Pachner AR, D Dail, K Narayan, K Dutta, and D Cadavid. Increased expression of B-lymphocyte chemoattractant, but not pro-inflammatory cytokines, in muscle tissue in rhesus chronic Lyme borreliosis. *Cytokine* 2002; 19: 297-307.
  203. Pachner AR, Basta J, Delaney E, and Hulinska D. Localization of *Borrelia burgdorferi* in murine Lyme borreliosis by electron microscopy. *Am J Trop Med Hyg* 1995; 52: 128-133.
  204. Pahl A, Kühbrandt U, Brune K, Röllinghoff M, and Gessner A. Quantitative detection of *Borrelia burgdorferi* by real-time PCR. *J Clin Microbiol* 1999; 37: 1958-1963.
  205. Pal GS, Baker JT, and Wright DJM. Penicillin resistant *Borrelia* encephalitis responding to cefotaxime. *Lancet* 1988; 338: 50-51.
  206. Pál E, Barta Z, Nagy F, Wágner M, Vécsei L. Neuroborreliosis in county Baranya, Hungary. *Funct Neurol*. 1998 Jan-Mar;13(1):37-46.

207. Pedersen LM, Friis-Møller A. Late treatment of chronic Lyme arthritis. *Lancet*. 1991 Jan 26;337(8735):241.
208. Petrovic M, Vogelaers D, Van Renterghem L, Carton D, De Reuck J, and Afschrift M. Lyme borreliosis – review of the late stages and treatment of four cases. *Acta Clin Belg*. 1998; 53: 178-183.
209. Pfister HW, Preac Mursic V, Wilske B, Schielke E, Sorgel F, Einhaupl KMJ. Randomized comparison of ceftriaxone and cefotaxime in Lyme neuroborreliosis. *Infect Dis* 1991; 163(2): 311-318. [In one patient, Bb as isolated from the cerebrospinal fluid 7.5 months after ceftriaxone therapy and, thus, showing that extended therapy is necessary.]
210. Phillips SE, Mattman LH, Hulinska D, and Moayad H. A proposal for the reliable culture of *Borrelia burgdorferi* from patients with chronic Lyme disease, even from those aggressively treated. *Infection* 1998; 26: 364-67.
211. Phillips SE, Harris NS, Horowitz R, Johnson L, Stricker RB. Lyme disease: scratching the surface. *Lancet* 2005; 366: 1771.
212. Phillips SE, Burrascano JJ, Harris NS, Johnson L, Smith PV, Stricker RB. Chronic infection in 'post-Lyme borreliosis syndrome. *Int J Epidemiol* 2005; 34: 1439-1440.
213. Picha D, Moravcová L, Holecková D, Zd'ársky E, Valesová M, et al. Examination of specific DNA by PCR in clinical relapse of disseminated Lyme borreliosis. *Int J Dermatol*. 2008; 47: 1004-1010.
214. Picken RN, Strle F, Picken MM et al. Identification of three species of *Borrelia burgdorferi* sensu lato (*B. garinii*, *B. afzelii*) among isolates from acrodermatitis chronica atrophicans lesions. *J Invest Dermatol* 1998; 110; 211-214. [chronic Lyme borreliosis].
215. Preac-Mursic V, Weber K, Pfister HW, Wilske B, Gross B, Baumann A, Prokop J. Survival of *Borrelia burgdorferi* in antibioticly treated patients with Lyme borreliosis. *Infection* 1989; 17(6): 355-359.
216. Preac-Mursic V, Patsouris E, Wilske B, Reinhardt S, Gross, and Mehraein P. Persistence of *Borrelia burgdorferi* and histopathological alterations in experimentally infected animals: a comparison with histopathological findings in human Lyme disease. *Infection* 1990; 18: 332-341. [gerbils]
217. Preac-Mursic V, Pfister HW, Spiegel H, Burk K, Wilske B, Reinhardt S, Boehmer R. First isolation of *Borrelia burgdorferi* from an iris biopsy. *J Clin Neuroophthalmol* 1993; 13(3): 155-161.
218. Preac Mursic V, Wanner G, Reinhardt S, Wilske B, Busch U, Marget W. Formation and cultivation of *Borrelia burgdorferi* spheroplast-L-form variants. *Infection* 1996; 24: 218-226.
219. Preac Mursic V, Marget W, Busch U, Rigler DP, Hagl S. Kill kinetics of *Borrelia burgdorferi* and bacterial findings in relation to the treatment of Lyme borreliosis. *Infection* 1996; 24(1): 9-16. [Bb was isolated by culture in five patients, four of whom had previously tested antibody-negative.]
220. Priem S, Burmester GR, Kamradt T, Wolbart K, Rittig MG, et al. 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(2): 118-121. [After antibiotic treatment, synovial membrane still demonstrates spirochetes].
221. Reid MC, Schoen RT, Evans J, Rosenberg JC, and Horowitz RI. The consequences of overdiagnosis and overtreatment of Lyme disease: an observational study. *Ann Intern Med*. 1998;128(5): 354-362.
222. Reimers CD, de Koning J, Neubert U, Preac Mursic V, Koster JG, Muller Felberl W, Pongratz DE, Duray PH. *Borrelia burgdorferi* myositis: report of eight patients. *J*

- Neurol 1993; 240(5):278-283.
223. Rittig MG, Häupl T, Krause A, Kressel M, Groscurth P, Burmester GR. *Borrelia burgdorferi*-induced ultrastructural alterations in human phagocytes: a clue to pathogenicity? *J Pathol* 1994; 173: 269-282.
224. Roberts ED, Bohm RP, Jr., Cogswell FB, Lanners HN, Lowrie RC, Jr., et al. Chronic Lyme disease in the rhesus monkey. *Lab Invest*. 1995;72: 146-160. [rhesus monkey]
225. Roberts ED, Bohm RP, Jr., Lowrie RC, Jr., Habicht G, Katona L, Piesman J, and Philipp MT. Pathogenesis of Lyme neuroborreliosis in the rhesus monkey: the early disseminated and chronic phases of disease in the peripheral nervous system. *J Infect Dis* 1998; 178: 722-732.
226. Rocha R, Lisboa L, Neves J, García López M, Santos E, Ribeiro A. Neuroborreliosis presenting as acute disseminated encephalomyelitis. *Pediatr Emerg Care*. 2012 Dec;28(12):1374-6.
227. Roháčová H, Hancil J, Hulinská D, Mailer H, Havlik J. Ceftriaxone in the treatment of Lyme neuroborreliosis. *Infection*. 1996 (Jan-Feb); 24(1): 88-90.
228. Roelcke U, Barnett W, Wilder-Smith E, Sigmund D, and Hacke W. Untreated neuroborreliosis: Bannwarth syndrome evolving into acute schizophrenia-like psychosis. *J Neurol* 1992; 239: 129-131.
229. Rosa Neto NS, Gauditano G, Yoshinari NH. Chronic lymphomonocytic meningoencephalitis, oligoarthritis and erythema nodosum: report of Baggio-Yoshinari syndrome of long and relapsing evolution. *Rev Bras Reumatol*. 2014 Mar-Apr;54(2):148-51.
230. Ruzic-Sabljic E, Strle F, and Cimperman J. The *Ixodes ricinus* tick as a vector of *Borrelia burgdorferi* in Slovenia. *Eur J Epidemiol* 1993; 9: 396-400.
231. Sala-Lizarraga JA, Salcede-Vivo J, Ferris J, Lopez-Andreu JA. Lyme borreliosis *Lancet* 1990; 345: 1436-1437.
232. Salit IE, Artsob H, Cheung SC. Imported case of Bannwarth's syndrome (chronic lymphocytic meningoradiculitis or Lyme meningitis). *Can Dis Wkly Rep*. 1988 Feb 27;14(8):31-4.
233. Sapi E, and MacDonald A. Biofilms of *Borrelia burgdorferi* in chronic cutaneous borreliosis. *Am. J. Clin. Pathol*. 2008; 129: 988-989. [biofilms consist of a colony of spirochetes and cysts coated by a gelatinous, protective membrane]
234. Sapi E, Kaur N, Anyanwu S, Luecke DF, Datar A, Patel S, Rossi M, Stricker RB. Evaluation of in vitro antibiotic susceptibility of different morphologic form of *Borrelia burgdorferi*. *Drug Resist*. 2011; 4: 97-113.
235. Sapi E, Bastian SL, Mpoy CM, Scott S, Rattelle A, Pabbati N, Poruri A, Buruga D, Theophilus PAS, Pham TV, Datar A, Dhaliwai NK, MacDonald A, Rossi MJ, Sinha SK, and Luecke DF. 2012. Characterization of biofilm formation by *Borrelia burgdorferi* in vitro. *PLOS One* 7(10): e48277. doi: 10.1371/journal.pone.0048277 [biofilms consist of a colony of spirochetes and cysts coated by a gelatinous, protective membrane]
236. Sapi E, Pabbati N, Datar A, Davies EM, Rattelle A and Kuo BA. Improved culture conditions for the growth and detection of *Borrelia* from human serum. *Int J Med Sci* 2013; 10: 362-376.
237. Sauer A, Hansmann Y, Jaulhac B, Bourcier T, Speeg-Schatz C. Five cases of paralytic strabismus as a rare feature of Lyme disease. *Clin Infect Dis*. 2009 Mar 15;48(6):756-9.
238. Schoen RT, Aversa JM, Rahn DW, and Steere AC. Treatment of refractory chronic Lyme arthritis with arthroscopic synovectomy. *Arthritis Rheum* 1991; 34(8): 1056-1060.
239. Schlesinger P, Duray P, Burke B, Steere A, and Stillman A. Maternal-fetal

- transmission of the Lyme disease spirochete *Borrelia burgdorferi*. *Ann Intern Med* 1985; 103: 67-68.
240. Schned ES. Lyme disease as an etiology of "unexplained" recurrent monoarthritis. *Minn Med*. 1984 Jun;67(6):325-8.
  241. Schmidli J, Hunziker T, Moesli P, Schaad UB. Cultivation of *Borrelia burgdorferi* from joint fluid three months after treatment of facial palsy due to Lyme borreliosis. *J Inf Dis* 1988; 158(4): 905-906. [Bb was cultured from joint fluid after treatment.]
  242. Schmitz JL, Schell RF, Lovrich SD, Callister SM and Coe JE; Characterization of the protective antibody response to *Borrelia burgdorferi* in experimentally infected LDH hamsters. *Infect Immun* 1991; 59: 1916-1921.
  243. Schwan TG, Burgdorfer W, Schrupf ME, Karstens RH. The urinary bladder: a consistent source of *Borrelia burgdorferi* in experimentally infected white-footed mice (*Peromyscus leucopus*). *J Clin Microbiol*. 1988;26: 893-895. [white-footed mice]
  244. Schwann TG, Piesman J, Golde WT, Dolan MC, Ros PA. Induction of an outer surface protein on *Borrelia burgdorferi* during tick feeding. *Proc Natl. Acad. Sci. USA*. 1995; 92: 2909-2913. [change in physical characteristics by altering immunogenicity]
  245. Seiler KP, and Weis JJ. Immunity to Lyme disease: protection, pathology and persistence. *Curr Opin Immunol* 1996; 8: 503-509.
  246. Shadick NA, Phillips CB, Logigian EL, Steere AC, Kaplan RF, Berardi VP, et al. The long-term clinical outcomes of Lyme disease. A population-based retrospective cohort study. *Ann Int Med* 1994; 121: 560-567.
  247. Sharma B, Brown AV, Matluck NE, Hu LT, Lewis K. *Borrelia burgdorferi*, the Causative Agent of Lyme Disease, Forms Drug-Tolerant Persister Cells. *Antimicrob Agents Chemother*. 2015 Aug;59(8):4616-24.
  248. Shui Y, Tao W, Huang D, Li Y, Fan B. Spinal cord stimulation for chronic pain originating from Lyme disease. *Pain Physician*. 2012 Nov-Dec;15(6):511-4.
  249. Singh SK and HJ Girschick. Molecular survival strategies of the Lyme disease spirochete *Borrelia burgdorferi*. *Lancet Infect Dis* 2004; 4: 575-583. [*B. burgdorferi* survives in ligaments, tendons, fibroblasts, synovial cells, endothelial cells, deep invaginations of cell membranes, myocytes, joints, eyes, and bones.]
  250. Skogman BH, Croner S, Nordwall M, Eknefelt M, Ernerudh J, and Forsberg P. Lyme neuroborreliosis in children: a prospective study of clinical features, prognosis, and outcome. *Pediatr Infect. Dis. J*. 2008; 27(12): 1089-1094.
  251. Snyderman DR, Schenkein DP, Berardi VP, Lastavica CC, Pariser KM. *Borrelia burgdorferi* in joint fluid in chronic Lyme arthritis. *Ann Intern Med*. 1986;104(6):798-800.
  252. Sonnesyn SW, Manivel JC, Johnson RC, Goodman JL. A guinea pig model for Lyme disease. *Infect Immun*. 1993;61: 4777-4784. [guinea pig]
  253. Stanek G, Klein J, Bittner R, and Glogar D. Isolation of *Borrelia burgdorferi* from the myocardium of a patient with long standing cardiomyopathy. *N Engl J Med* 1990; 322: 249-252.
  254. Steere AC, Duray PH., and Butcher EC. Spirochetal antigens and lymphoid cell surface markers in Lyme synovitis. Comparison with rheumatoid synovium and tonsillar lymphoid tissue. *Arthritis Rheum* 1988; 31: 487-495.
  255. Steere AC, Bernardi VP, Weeks KE., Logigian EL, Ackermann R. Evaluation of the intrathecal antibody response to *Borrelia burgdorferi* as a diagnostic test for Lyme neuroborreliosis. *J. Infect. Dis*. 1990; 161(6): 1203-1209.
  256. Steere AC, Taylor E, McHugh GL, and Logigian EL. The overdiagnosis of Lyme disease. *JAMA*. 1993; 269(14): 1812-1816.
  257. Steere AC, Levin RE, Molloy PJ, Kalis RA, Abraham JH, Liu NY, Schmid CH.

- Treatment of Lyme arthritis. *Arthritis Rheum* 1994; 37: 878-888.
258. Stein SL, Solvason HB, Biggart E, Spiegel D. A 25-year-old woman with hallucinations, hypersexuality, nightmares, and a rash. *Am J Psychiatry* 1996; 153: 545-551.
259. Straubinger RK, Straubinger AF, Jacobson RH, Chang Y, Summers BA, Erb HN, Appel MJG. Two lessons from the canine model of Lyme disease: migration of *Borrelia burgdorferi* in tissues and persistence after antibiotic treatment. *J Spiro Tick-Borne Dis* 1997; 4: 24-31. [In dogs: 30-day treatment diminished but failed to eliminate persistent infection.]
260. Straubinger RK, Summers BA, Chang YF, Appel MJG. Persistence of *Borrelia burgdorferi* in experimentally infected dogs after antibiotic treatment. *J Clin Microbiol* 1997;35: 111-116. [dogs]
261. Straubinger RK. PCR-based quantification of *Borrelia burgdorferi* organisms in canine tissues over a 500-day postinfection period. *J Clin Microbiol* 2000; 38: 2191-2199. [All 8 infected dogs previously treated with 30-day antibiotics were PCR positive from tissue samples after necropsy].
262. Straubinger RK, Straubinger AF, Summers BA, and Jacobson RH. Status of *Borrelia burgdorferi* infection after antibiotic treatment and the effects of corticosteroids: an experimental study. *J Infect Dis* 2000;181: 1069-1081.
263. Stricker RB, Winger EE. Decreased CD57 lymphocyte subset in patients with chronic Lyme disease. *Immunology Letters*. 2001. 76: 43-48.
264. Stricker RB, Burrascano JJ, Winger EE. Long-term decrease in the CD57 lymphocyte subset in a patient with chronic Lyme disease. *Ann Agric Environ Med* 2002; 9: 111-113.
265. Stricker RB, Lautin A, Burrascano JJ. Lyme disease: point/counterpoint. *Expert Rev Anti-Infect Ther* 2005; 3: 155-165.
266. Stricker RB. Counterpoint: long-term antibiotic therapy improves persistent symptoms associated with Lyme disease. *Clin Infect Dis* 2007; 45: 149-157.
267. Stricker RB and Johnson L. Persistent *Borrelia burgdorferi* infection after treatment with antibiotics and anti-tumor necrosis factor- $\alpha$ . *J Infect Dis* 2008; 197: 1352-1353.
268. Stricker RB, Johnson L. Lyme disease diagnosis and treatment: lessons from the AIDS epidemic. *Minerva Med*. 2010;101(6):419-425.
269. Stricker RB, Johnson L. Lyme disease: the next decade. *Infect. Drug Resist*. 2011; 4: 1-9.
270. Stricker RB, Johnson L. Persistent infection in chronic Lyme disease: does form matter? *Res J Infect Dis* 2013;1:2. <http://dx.doi.org/10.7243/2052-5958-1-2>.
271. Stricker RB, Johnson L. *Borrelia burgdorferi* aggregase activity: more evidence for persistent infection in Lyme disease. *Front Cell Infect Microbiol*. 2013 Aug 14;3:40.
272. Strle F, Preac-Mursic V, Cimperman J, Ruzic E, Maraspin V, and Jereb M. Azithromycin versus doxycycline for treatment of erythema migrans: clinical and microbiological findings. *Infection* 1993; 21(2): 83-88.
273. Strle F, Cheng Y, Cimperman J, Maraspin V, Lotric-Furlan S, Nelson JA, Picken MM, Ruzic-Sabljić E, and Picken R. Persistence of *Borrelia burgdorferi* sensu lato in resolved erythema migrans lesions. *Clin Inf Dis* 1995; 23: 380-389.
274. Strle F, Maraspin V, Lotric-Furlan, Ruzic-Sabljić E, and Cimperman J. Azithromycin and doxycycline for treatment of *Borrelia* culture-positive erythema migrans. *Infection* 1996; 24: 64-68. [Skin-positive despite repeated antibiotic treatments.]
275. Summers BA, Straubinger AF, Jacobson RH, Chang YF, Appel MJG, Straubinger RK. Histopathological studies of experimental Lyme disease in the dog. *J*

- Comparative Pathol 2005; 133: 1-13.
276. Sung SY, McDowell JV, Carlyon JA, and Marconi RT. Mutation and recombination in the upstream homology box-flanked ospE-related genes of the Lyme disease spirochetes result in the development of new antigenic variants during infection. *Infect Immun* 2000; 68; 1319-1327.
277. Szer IS, Taylor E, Steere AC. The long-term course of Lyme arthritis in children. *N Engl J Med*. 1991 Jul 18;325(3):159-63.
278. Trevisan G, Cinco M, Agolzer A. Roseolar lesions in Lyme disease: Isolation of the causative agent. *Int J Dermatol* 1992;31:507-508.
279. Tunev SS, Hastey CJ, Hodzic E, Feng S, Barthold SW, Baumgarth N. Lymphadenopathy during Lyme borreliosis is caused by spirochete migration-induced specific B cell activation. *PLoS Pathog*. 2011 May;7(5):e1002066.
280. Valesová M, et al. Detection of *Borrelia* in the synovial tissue from a patient with Lyme borreliosis by electron microscopy. *J. Rheumatol*. 1989;16(11): 1502-1505. [intracellular sanctuaries of Bb]
281. Valesová H, Mailer J, Havlik J, Hulínská, D, Hercogová. Long-term results in patients with Lyme arthritis following treatment with ceftriaxone. *Infection*. 1996 (Jan-Feb); 24(1): 98-102.
282. Vartiavaara I. Living with Lyme. *Lancet* 1995; 345: 842-844.
283. Vegsundvåg J, Nordeide J, Reikvam A, Jenum P. Late cardiac manifestation of infection with *Borrelia burgdorferi* (Lyme disease). *BMJ*. 1993 Jul 17;307(6897):173.
284. Walberg P, Granlund H, Nyman D, Panelius J, Seppälä I. Treatment of late Lyme borreliosis. *J Infection*. 1994; 29: 255-261.
285. Waniek C, Prohovnik I, Kaufman MA, Dwork AJ. Rapid progressive frontal-type dementia associated with Lyme disease. *J Neuropsychiatry Clin Neurosci*. 1995; 7: 345-347. (B. burgdorferi detected at autopsy).
286. Wang P, Gartenhaus R, Sood SK, DeVoti J, Singer C, Dorante G, Hilton E. Detection of *Borrelia* DNA in circulating monocytes as evidence of persistent Lyme disease. *J Spiro Tick-Borne Dis*. 2000; 7: 16-19.
287. Weber K. Treatment failure in erythema migrans: a review. *Infection*. 1996; 24: 73-75.
288. Weis JJ, Yang L, Seiler KP, Silver RM. Pathological manifestations in murine Lyme disease: association with tissue invasion and spirochete persistence. *Clin Infect Dis* 1997 (Suppl 1): S18-24.
289. Wienecke R, Zoehling N, Neubert U. Molecular subtyping of *Borrelia burgdorferi* in erythema migrans and acrodermatitis chronica atrophicans. *J Invest Dermatol* 1994; 103; 19-22. [chronic Lyme borreliosis].
290. Xu Q, Mcshan K, Liang FT. Modification of *Borrelia burgdorferi* to overproduce OspA or VlsE alters its infectious behaviour. *Microbiology* 2008; 154: 3420-3429.
291. Yang L, Weis JH, Eichwald E, Kolbert CP, Persing DH, Weis JJ. Heritable susceptibility to severe *Borrelia burgdorferi*-induced arthritis is dominant and is associated with persistence of large numbers of spirochetes in tissues. *Infect Immun* 1994; 62: 492-500.
292. Young D, Hussell T, Dougan G. Chronic bacterial infections: living with unwanted guests. *Nat Immunol* 2002 Nov; 3(11): 1026-1032.
293. Yrjänäinen H, Hytönen J, Söderström KO, Oksi J, Hartiala K, Viljanen MK. Persistent joint swelling and *Borrelia*-specific antibodies in *Borrelia garinii*-infected mice after eradication of vegetative spirochetes with antibiotic treatment. *Microbes Infect* 2006;8: 2044-2051. [persistence if Bb in mice]
294. Yrjänäinen H, Hytonen J, Song SR, Oksi J, Hartiala K, et al. Anti-tumor



- necrosis factor-alpha treatment activates *Borrelia burgdorferi* spirochetes in 4 weeks after ceftriaxone treatment in C3H/He mice. *J Infect Dis* 2007;195: 1489-1496. [mice]
295. Yrjänäinen H, Hytönen J, Hartiala P, Oksi J, Viljanen MK. Persistence of borrelial DNA in the joints of *Borrelia burgdorferi*-infected mice after ceftriaxone treatment. *APMIS* 2010;118(9): 665-673. [*Borrelia burgdorferi* DNA in joints and tissue adjacent to the joint is the niche of persisting *B. burgdorferi* in ceftriaxone-treated mice.]
296. Zalaudek I, Leinweber B, Kerl H, Müllegger RR. Acrodermatitis chronica atrophicans in a 15-year-old girl misdiagnosed as venous insufficiency for 6 years. *J Am Acad Dermatol.* 2005 Jun;52(6):1091-4.
297. Zhang JR, Hardham JM, Barbour AG, and Norris SJ. Antigenic variation in Lyme disease borreliae by promiscuous recombination of VMP-like sequence cassettes. *Cell* 1997; 89: 275-285. [antigenic variation: a defense stratagem of *B. burgdorferi*]
298. Zhang Y. Persisters, persistent infections and the Yin-Yang model. *Emerg Microbes Infect* 2014;3:e3.
299. Zimering JH, Williams MR, Eiras ME, Fallon BA, Logigian EL, Dworkin RH et al. Acute and chronic pain associated with Lyme borreliosis: clinical characteristics and pathophysiologic mechanisms. *Pain.* 2014 Aug;155(8):1435-1438.
300. Ziska MH, Donta ST, Demarest FC. Physician preferences in the diagnosis and treatment of Lyme disease in the United States. *Infection* 1996; 24: 182-186.

### **Neuropsychiatric Symptoms and Lyme/Tick-Borne Diseases**

1. Aalto A, Sjowall J, Davidsson L, Forsberg P, Smedby O. Brain magnetic resonance imaging does not contribute to the diagnosis of chronic neuroborreliosis. *Acta Radiol* 2007; 48: 755-762. [white matter hyperintensities or basal ganglia lesions].
2. Ackermann R, Rehse-Kupper B, Gollmer E, Schmidt R. Chronic neurologic manifestations of erythema migrans borreliosis. *Ann N Y Acad Sci.* 1988;539:16-23.
3. Adams WV, Rose CD, Eppes SC, Klein JD. Long-term cognitive effects of Lyme disease in children. *Appl Neuropsychol* 1999;6(1):39-45
4. Alaedini A, Latov N. Antibodies against OspA epitopes of *Borrelia burgdorferi* cross-react with neural tissue. *J Neuroimmunol.* 2005 Feb;159(1-2):192-5. Epub 2004 Nov 26.
5. Almeida OP, Lautenschlager NT. Dementia associated with infectious diseases. *Int Psychogeriatr.* 2005;17 Suppl 1:S65- 77. Review.
6. Amsterdam JD, O'Reardon JP. Treatment-Resistant Depression: Progress and Limitations. *Psychiatric Annals.* 1998;28(11):633
7. APA Work Group on Psychiatric Evaluation. The American Psychiatric Association Psychiatric Guidelines for the Psychiatric Assessment of Adults Third Edition.
8. Asadipooya K, Dehghanian A, Omrani GH, Abbasi F. Short-course treatment in neurobrucellosis: a study in Iran. *Neurol India.* 2011 Jan-Feb;59(1):101-3.
9. Asch ES, Bujak DI, Weiss M, Peterson MG, Weinstein A. Lyme disease: an infectious and postinfectious syndrome. *J Rheumatol.* 1994 Mar;21(3):454-61
10. Askenazy F, Dor E, Benoit M, Dupuis G, Serret S, Myquel M, Seddiki Y. Catatonia in a 14 year-old girl: treatment with clorazepam and carbamazepine, a 10-year follow-up. *Encephale.* 2010 Feb;36(1):46-53.
11. Banerjee R, Liu JJ, Minhas HM. Lyme neuroborreliosis presenting with alexithymia and suicide attempts. *J Clin Psychiatry.* 2013 Oct;74(10):981.
12. Bar KJ, Jochum T, Hager F, Meissner W, Sauer H. Painful hallucinations and somatic delusions in a patient with the possible diagnosis of neuroborreliosis. *Clin J Pain.* 2005

- Jul-Aug;21(4):362-3.
13. Barnett W, Sigmund D, Roelcke U, Mundt C. Endogenous paranoid-hallucinatory syndrome caused by *Borrelia encephalitis* Nervenarzt 1991 Jul;62(7):445-7 [German]
  14. Battaglia H, Alvarez G, Mercu A, Fay M, Campodonico M. Psychiatric symptomatology associated with presumptive Lyme disease: Clinical evidence. J Spiro Tick-Borne Dis 2000; 7: 22-25.
  15. Bechter K. Diagnosis of infectious or inflammatory psychosyndromes. Open Neurol J. 2012; 6:113-118.
  16. Binalsheikh IM, Griesemer D, Wang S, Alvarez-Altalef R. Lyme neuroborreliosis presenting as Alice in Wonderland syndrome. Pediatr Neurol. 2012; 46:185-186.
  17. Tselis A, MD, Booss J. Behavioral consequences of infections of the central nervous system: with emphasis on viral infections. J Am Acad Psychiatry Law 2003;31:289-98.
  18. Belman AL, Iyer M, Coyle PK, Dattwyler R. Neurologic manifestations in children with North American Lyme disease. Neurology. 1993 Dec;43(12):2609-14.
  19. Belman AL, Iyer M, Coyle PK, Dattwyler R. Neurologic manifestations in children with North American Lyme disease. Neurology. 1993 Dec;43(12):2609-14.
  20. Benke T, Gasse T, Hittmair-Delazer M, Schmutzhard E. Lyme encephalopathy: long-term neuropsychological deficits years after acute neuroborreliosis. Acta Neurol Scand. 1995 May;91(5):353-7.
  21. Berman DS, Wenglin BD. Complaints attributed to chronic Lyme disease: depression or fibromyalgia? Am J Med. 1995 Oct;99(4):440.
  22. Bertholon P, Cazorla C, Carricajo A, Oletski A, Laurent B. Bilateral sensorineural hearing loss and cerebellar ataxia in the case of late stage Lyme disease. Braz J Otorhinolaryngol. 2012 Dec;78(6):124.
  23. Bertrand E, Szpak GM, Pilkowski E, Habib N, Lipczynska-Lojkowska W, Rudnicka A, Tylewska-Wierzbanska S, Kulczycki J. Central nervous system infection caused by *Borrelia burgdorferi*. Clinico-pathological correlation of three post-mortem cases. Folia Neuropathol 1999;37:43-51.
  24. Biesiada G, Czapiel J, Sobczyk-Krupiarz I, Garlicki A, Mach T. Neuroborreliosis with extrapyramidal symptoms: a case report. Pol Arch Med Wewn. 2008 May;118(5):314-7.
  25. Bitam I, Raoult D. Other Tick-Borne Diseases in Europe. Curr Probl Dermatol. 2009;37:130-154. Epub 2009 Apr 8
  26. Blanc F; GEBLY. Neurologic and psychiatric manifestations of Lyme disease. Med Mal Infect. 2007 Jul-Aug;37(7- 8):435-45. Epub 2007 Mar 9. Review.
  27. Bloom BJ, Wyckoff PM, Meissner HC, Steere AC. Neurocognitive abnormalities in children after classic manifestations of Lyme disease. Pediatr Infect Dis J 1998; 17(3):189-96.
  28. Bloom BJ, Wyckoff PM, Meissner HC, Steere AC. Neurocognitive abnormalities in children after classic manifestations of Lyme disease. Pediatr Infect Dis J. 1998 Mar;17(3):189-96.
  29. Borgermans L, Goderis G, Vandevoorde J, Devroey D. Relevance of chronic Lyme disease to family medicine as a complex multidimensional chronic disease construct: A systematic review. Int J Family Med. 2014;2014:138016.
  30. Bransfield R, Brand S, Sherr V. Treatment of patients with persistent symptoms and a history of Lyme disease. N Engl J Med. 2001 Nov 8;345(19):1424-5.
  31. Bransfield RC. The psychoimmunology of Lyme/tick-borne diseases and its association with neuropsychiatric symptoms. Open Neurol J. 2012; 6:88-93.
  32. Bransfield RC, Wulfman JS, Harvey WT, Usman AI. The association between tick-borne infections, Lyme borreliosis and autism spectrum disorders. Med Hypotheses.

- 2008;70(5):967-74.
33. Bransfield RC. Case report: Lyme disease and complex partial seizures. *J Spiro Tick-borne Dis.* 1999; 6:123-125 .
  34. Bransfield RC. Diagnosis, treatment, and prevention of Lyme disease. *JAMA.* 1998 Sep 23-30;280(12):1049; author reply 1051.
  35. Bransfield RC. Lyme disease, comorbid tick-borne diseases, and neuropsychiatric disorders. *Psychiatric Times.* 2007 Dec; 24(14):59-61
  36. Bransfield RC. Preventable cases of autism: relationship between chronic infectious disease and neurological outcome. *Pediatric Health.* (2009) April 3(2).
  37. Bransfield RC. Relationship of Inflammation and Autoimmunity to Psychiatric Sequelae in Lyme Disease. *Psychiatric Ann.* 2012 42(9):337-41
  38. Bransfield RC. The diagnosis of Lyme disease. *Hosp Pract (Minneap).* 1996 Aug 15;31(8):35, 40.
  39. Bransfield RC, Kuhn M. Autism and Lyme disease. *JAMA.* 2013 Aug 28;310(8):856-7.
  40. Bransfield RC. The psychoimmunology of Lyme/tick-borne diseases and its association with neuropsychiatric symptoms. *Open Neurol J.* 2012; 6: 88-93.
  41. Bransfield RC. Intrusive symptoms and infectious encephalopathies. *Neurol Psychiatr Brain Res.* 2016; 22(1): 3-4.
  42. Breitschwerdt EB, Maggi RG, Cadenas MB, Vissotto de Paiva Diniz PP. A groundhog, a novel Bartonella sequence, and my father's death. *Emerg Infect Dis.* 2009 Aug;15(12): 2080-6.
  43. Breitschwerdt EB. Bartonellosis, One Health and all creatures great and small. *Vet Dermatol.* 2017 Feb;28(1):96-e21.
  44. Breitschwerdt EB, Maggi RG, Nicholson WL, Cherry NA, Woods CW. Bartonella sp. bacteremia in patients with neurological and neurocognitive dysfunction. *J Clin Microbiol.* 2008;46(9):2856–2861.
  45. Brinck T, Hansen K, Olesen J. Headache resembling tension-type headache as the single manifestation of Lyme neuroborreliosis. *Cephalalgia.* 1993 Jun;13(3):207-9.
  46. Brown JS Jr. Geographic correlation of schizophrenia to ticks and tick-borne encephalitis. *Schizophr Bull* 1994;20(4):755-75 .
  47. Burakgazi AZ. Lyme disease -induced polyradiculopathy mimicking amyotrophic lateral sclerosis. *Int J Neurosci.* 2014 Nov;124(11):859-62.
  48. Burns RB, Hartman EE. A 58-year-old man with a diagnosis of chronic Lyme disease, 1 year later. *JAMA.* 2003 Dec 24;290(24):3247.
  49. Caliendo MV, Kushon DJ, Helz JW. Delirium and Lyme disease. *Psychosomatics.* 1995 Jan-Feb;36(1):69-74.
  50. Cameron D. Severity of Lyme disease with persistent symptoms. Insights from a double-blind placebo-controlled clinical trial. *Minerva Med.* 2008 Oct;99(5):489-96.
  51. Cameron DJ Consequences of treatment delay in Lyme disease. *J Eval Clin Pract.* 2007 Jun;13(3):470-2.
  52. Carla Rothaus A Girl with Seizures SOURCE: NEJM. May 22nd, 2015  
<http://blogs.nejm.org/now/index.php/a-girl-with-seizures/2015/05/22/comment-page-1/#comment-225701>
  53. Chabria SB, Lawrason J Altered mental status, an unusual manifestation of early disseminated Lyme disease: A case report.. *J Med Case Reports.* 2007 Aug 9;1:62.
  54. Chan L, Reilly KM, Snyder HS. An unusual presentation of cat scratch encephalitis. *J Emerg Med.* 1995 Nov- Dec;13(6):769-72.
  55. Chandra AM, Keilp JG, Fallon BA Correlates of Perceived Health-Related Quality of Life in Post-treatment Lyme Encephalopathy. *Psychosomatics.* 2013 Jul 9.

doi:10.1016/j.psym.2013.04.003

56. Cheherama M, Zagardo MT, Koski CL Subarachnoid hemorrhage in a patient with Lyme disease. *Neurology*. 1997;48:520-523
57. Cintron R, Pachner AR. Spirochetal diseases of the nervous system. *Curr Opin Neurol*. 1994 Jun;7(3):217-22. Review.
58. Clarissou J, Song A, Bernede C, Guillemot D, Dinh A, Ader F, Perronne C, Salomon J. Efficacy of a long-term antibiotic treatment in patients with a chronic Tick Associated Poly-organic Syndrome (TAPOS). *Med Mal Infect*. 2009 Feb;39(2):108-15. Epub 2009 Jan 4.
59. Corral I, Sanchis G, Garcia-Ribas G, Quereda C, Escudero R, de Blas G. Demyelinating polyradiculitis in neuroborreliosis. *Neurologia*. 1995 Feb;10:110-113 .
60. Cowley G, Underwood A. A disease in disguise. Lyme can masquerade as migraine, or as madness. *Newsweek*. 2004 Aug 23;144(8):62.
61. Coyle PK, Deng Z, Schutzer SE, Belman AL, Benach J, Krupp LB, Luft B. Detection of *Borrelia burgdorferi* antigens in cerebrospinal fluid. *Neurology* 1993;43:1093-1097.
62. Coyle PK, Schutzer SE, Deng Z, Krupp LB, Belman AL, Benach JL, Luft BJ. Detection of *Borrelia burgdorferi*-specific antigen in antibody-negative cerebrospinal fluid in neurologic Lyme disease. *Neurology*. 1995 Nov;45(11):2010-5.
63. Créange A. Clinical manifestations and epidemiological aspects leading to a diagnosis of Lyme borreliosis: neurological and psychiatric manifestations in the course of Lyme borreliosis *Med Mal Infect*. 2007 Jul-Aug;37(7-8):532-9. Epub 2007 Mar 26.
64. Császár T, Patakfalvi A. Differential diagnostic problems in Lyme disease - *Borrelia* infection resulting in acute exogenous psychosis. *Orv Hetil*. 1994 Oct 9;135(41):2269-71.
65. Dattwyler RJ, Halperin JJ. Failure of tetracycline therapy in early Lyme disease. *Arthritis Rheum*. 1987 Apr;30(4):448- 50.
66. Dekonenko EP, Umanskii KG, Virich IE, Kupriianova LV, Rudometov, IuP, Bagrov FI The basic syndromes of neurological disorders in Lyme borreliosis. *Ter Arkh* 1995; 67 (11) : 52-53
67. Donta ST, Noto RB, Vento JA. SPECT Brain Imaging in Chronic Lyme Disease. *Clinical Nuclear Medicine & Volume 37, Number 9, September 2012*
68. Druschky K, Stefan H, Grehl H, Neundörfer B. Secondary normal pressure hydrocephalus. A complication of chronic neuroborreliosis. *Nervenarzt*. 1999 Jun;70(6):556-9. German.
69. Dupeyron A, Lecocq J, Jaulhac B, et al. Sciatica, disk herniation, and neuroborreliosis. A report of four cases. *Joint Bone Spine*. 2004; 71: 433-437.
70. Dupuis MJ. Multiple neurologic manifestations of *Borrelia burgdorferi* infection. *Rev Neurol (Paris)* 1988;144(12):765- 75
71. Edelstyn NM, Hunter B, Ellis SJ. Bilateral dorsolateral thalamic lesions disrupts conscious recollection. *Neuropsychologia*. 2006;44(6):931-8. Epub 2005 Oct 25.
72. Breitschwerdt EB, Mascarelli PE, Schweickert LA, Ricardo G, Maggi RG, Hegarty BC, Bradley JM, Woods CW. Hallucinations, sensory neuropathy, and peripheral visual deficits in a young woman infected with *Bartonella koehlerae*. *J Clin Microbiol*. 2011; 49: 3415–3417
73. Eikeland R, Mygland A, Herlofson K, Ljøstad U. European neuroborreliosis: quality of life 30 months after treatment. *Acta Neurol Scand*. 2011Nov;124(5):349-54.
74. Elkins LE, Pollina DA, Scheffer SR, Krupp LB. Psychological states and neuropsychological performances in chronic Lyme disease. *Appl Neuropsychol* 1999;6(1):19-26.
75. Engman M-L, Lindström K, Sallamba M, Hertz C, et al. One-year follow-up of tick-

- borne central nervous system infections in childhood. *Pediatric Infect Dis J*. 2012; 31(6): 570-4.
76. Eskow E, Rao RV, Mordechai E. Concurrent infection of the central nervous system by *Borrelia burgdorferi* and *Bartonella henselae*: evidence for a novel tick-borne disease complex. *Arch Neurol*. 2001 Sep;58(9):1357-63.
  77. Etienne M, Carvalho P, Fauchais AL, Pestel-Caron M, Doucet J, Chassagne P. Lyme neuroborreliosis revealed as a normal pressure hydrocephalus: a cause of reversible dementia. *J Am Geriatr Soc*. 2003 Apr;51(4):579-80.
  78. Fallon BA, Schwartzberg M, Bransfield R, Zimmerman B, Scotti A, Weber CA, Liebowitz MR. Late-stage neuropsychiatric Lyme borreliosis. Case reports. *Psychosomatics* 1995; 36: 295-300.
  79. Fallon BA, Das S, Plutchok JJ, Tager F, Liegner K, Van Heertum R. Functional brain imaging and neuropsychological testing in Lyme disease. *Clin Infect Dis* 1997; 25 (suppl 1): S57-S63.
  80. Fallon BA, Bird H, Hoven C, Cameron D, Liebowitz MR, Shaffer S. Psychiatric aspects of Lyme disease in children and adolescents: A community epidemiologic study in Westchester, New York. *J Spiro Tick-Borne Dis* 1994; 1:98-100
  81. Fallon BA, Das S, Plutchok JJ, Tager F, Liegner K, Van Heertum R. Functional Brain Imaging and Neuropsychological Testing in Lyme Disease. *Clin Infect Dis* 1997; 25:S57-63
  82. Fallon BA, Javitch JA, Hollander E, Liebowitz MR. Hypochondriasis and obsessive compulsive disorder: overlaps in diagnosis and treatment. *J Clin Psychiatry*. 1991; 52(11):457-60.
  83. Fallon BA, Keilp J, Prohovnik I, Heertum RV, Mann JJ. Regional cerebral blood flow and cognitive deficits in chronic Lyme disease. *J Neuropsychiatry Clin Neurosci*. 2003 Summer;15(3):326-32.
  84. Fallon BA, Kochevar JM, Gaito A, Nields JA. The underdiagnosis of neuropsychiatric Lyme disease in children and adults. *Psychiatr Clin North Am*. 1998; 21: 693-703
  85. Fallon BA, Levin ES, Schweitzer PJ, Hardesty D. Inflammation and central nervous system Lyme disease. *Neurobiol Dis*. 2010 Mar;37(3):534-41.
  86. Fallon BA, Lipkin RB, Corbera KM, Yu S, Nobler MS, Keilp JG, Petkova E, Lisanby SH, Moeller JR, Slavov I, Van Heertum R, Mensh BD, Sackeim HA. Regional cerebral blood flow and metabolic rate in persistent Lyme encephalopathy. *Arch Gen Psychiatry*. 2009 May;66(5):554-63.
  87. Fallon BA, Nields JA. Acute disseminated encephalomyelitis [letter]. *J Neuropsychiatry Clin Neurosci* 1998 Summer;10(3):366-7
  88. Fallon BA, Nields JA, Burrascano JJ, Liegner K, DelBene D, Liebowitz MR. The neuropsychiatric manifestations of Lyme Borreliosis. *Psychiatric Quarterly* 1992; 63: 95-117.
  89. Fallon BA, Nields JA, Parsons B, Liebowitz MR, Klein DF. Psychiatric manifestations of Lyme borreliosis. *J Clin Psychiatry* 1993 Jul;54(7):263-8
  90. Fallon BA, Nields JA. Lyme Disease: A neuropsychiatric illness. *Am J Psychiatry* 1994 Nov;151(11):1571-83
  91. Fallon BA, Petkova E, Keilp JG, Britton CB. Ongoing discussion about the US clinical Lyme trials. *Am J Med*. 2014 Feb;127(2):e7.
  92. Fallon BA, Keilp JG, Corbera KM, Petkova K, Britton CB, Dwyer E, et al. A randomized, placebo-controlled trial of repeated IV antibiotic therapy for Lyme encephalopathy. *Neurology* 2008; 70: 992-1003.
  93. Fallon BA, Petkova E, Keilp JG, Britton CB. A reappraisal of the U.S. clinical trials of post-treatment Lyme disease syndrome. *Open Neurol J*. 2012; 6:79-87.

94. Fallon BA, Schwartzberg M, Bransfield R, Zimmerman B, Scotti A, Weber CA, Liebowitz MR. Late-stage neuropsychiatric Lyme borreliosis: Differential diagnosis and treatment. *Psychosomatics* 1995;36:295-300
95. Fallon BA, Vaccaro B, Romano M, Clemente D. Neuropsychiatric and neuropathologic aspects of Lyme disease. *Psychiatric Annals*. 2006;36:120-128.
96. Fallon BA, Weis N, Tager F, Fein L, Liegner K, Liebowitz MR. Repeated antibiotic therapy in chronic Lyme disease. *J Spiro Tick-Borne Dis*. 1999; 6: 1-9.
97. Fallon BA, Keilp J, Prohovnik I, Heertum RV, Mann JJ. Regional cerebral blood flow and cognitive deficits in chronic Lyme disease. *J Neuropsychiatry Clin Neurosci* 2003; 15: 326-332.
98. Fallon BA, Lipkin RB, Corbera KM, Yu S, Nobler MS, Keilp JG, Petkova E, Lisanby SH, Moeller JR, Slavov I, Van Heertum R, Mensh BD, and Sackeim HA. Regional cerebral blood flow and metabolic rate in persistent Lyme encephalopathy. *Arch Gen Psychiatry* 2009; 66: 554-563.
99. Farshad-Amacker NA, Scheffel H, Frauenfelder T, Alkadhi H. Brainstem abnormalities and vestibular nerve enhancement in acute neuroborreliosis. *BMC Research Notes* 2013; 6: 551.
100. Ferroir JP, Reignier A, Nicolle MH, Guillard A. Meningoradiculoencephalitis in Lyme disease. A case with major regressive mental disorders. *Presse Med*. 1988 Apr 16;17(14):697.
101. Fritzsche M. Seasonal correlation of sporadic schizophrenia to Ixodes ticks and Lyme borreliosis. *Int J Health Geogr*. 2002; 1:2
102. Fritzsche M. Geographical and seasonal correlation of multiple sclerosis to sporadic schizophrenia. *Int J Health Geogr*. 2002 Dec 20;1(1):5.
103. Frykholm BO. On the question of infectious aetiologies for multiple sclerosis, schizophrenia and the chronic fatigue syndrome and their treatment with antibiotics. *Med Hypotheses* 2010 Apr;74(4):758-60.
104. Garakani A, Mitton AG. New-onset panic, depression with suicidal thoughts, and somatic symptoms in a patient with a history of Lyme disease. *Case Rep Psychiatry*. 2015;2015:457947.
105. Garcia-Monco JC, Benach JL. Lyme neuroborreliosis. *Ann Neurol* 1995 Jun; 37: 691-70.
106. García-Moncó JC, Benach JL Neurological manifestations of Lyme disease. *Enferm Infec Microbiol Clin*. 1989 Nov;7(9):501-6.
107. Garcia-Monco JC, Villar BF, Alen JC, Benach JL. *Borrelia burgdorferi* in the central nervous system: experimental and clinical evidence for early invasion. *J Infect Dis*. 1990 Jun;161(6):1187-93.
108. García-Moreno JM, Izquierdo G, Chacón J, Angulo S, Borobio MV. Neuroborreliosis in a patient with progressive supranuclear paralysis. An association or the cause? *Rev Neurol*. 1997 Dec;25(148):1919-21.
109. Gasse T, Murr C, Meyersbach P, Schmutzhard E, Wachter H, Fuchs D. Neopterin production and tryptophan degradation in acute Lyme neuroborreliosis versus late Lyme encephalopathy. *Eur J Clin Chem Clin Biochem*. 1994 Sep;32(9):685-9.
110. Gaudino EA, Coyle PK, Krupp LB. Post-Lyme syndrome and chronic fatigue syndrome. Neuropsychiatric similarities and differences. *Arch Neurol*. 1997 Nov;54(11):1372-6.
111. Gaudino EA, Coyle PK, Krupp LB. Post-Lyme syndrome and chronic fatigue syndrome. Neuropsychiatric similarities and differences. *Arch Neurol* 1997 Nov;54(11):1372-6

112. Gentile I, Zappulo E, Militerni R, Pascotto A, Borgia G, Bravaccio C. Etiopathogenesis of autism spectrum disorders: Fitting the pieces of the puzzle together. *Med Hypotheses*. 2013 Jul;81(1):26-35.
113. George TI, Manley G, Koehler JE, Hung VS, McDermott M, Bollen A. Detection of *Bartonella henselae* by polymerase chain reaction in brain tissue of an immunocompromised patient with multiple enhancing lesions. Case report and review of the literature. *J Neurosurg*. 1998 Oct;89(4):640-4.
114. Gerstenblith TA, Stern TA. Lyme disease: a review of its epidemiology, evaluation, and treatment. *Psychosomatics*. 2014 Sep-Oct;55(5):421-9.
115. Gheorghiev C, De Montleau F, Defuentes G. Alcohol and epilepsy: A case report between alcohol withdrawal seizures and neuroborreliosis. *Encephale* 2011 Jun;37(3):231-7.
116. Greenberg HE, Ney G, Scharf SM, Ravdin L, Hilton E. Sleep quality in Lyme disease. *Sleep*. 1995 Dec;18(10):912-6.
117. Greenberg R. Infections and childhood psychiatric disorders: Tick-borne illness and bipolar disorder in youth. *Bipolar Disord*. 2017; 3:1.
118. Greenblatt D, Krupp LB, Belman AL Parainfectious meningo-encephaloradiculo-myelitis (cat scratch disease, Lyme borreliosis, brucellosis, botulism, legionellosis, pertussis, mycoplasma). *Handb Clin Neurol* 2013; 112: 1195-207.
119. Grzywa A, Karakula H, Górecka J, Chuchra M. Delusional disorders in the course of tick-born encephalitis and borreliosis in patients with hemophilia A and posttraumatic epilepsy--diagnostic and therapeutic difficulties *Pol Merkur Lekarski*. 2004 Jan;16(91):60- 3. Polish.
120. Gueglio B, Raffi F, Marjolet M. Lyme neuroborreliosis of mental manifestation. Apropos of a case. *Rev Med Interne*. 1996;17(7):599. [French]
121. Gustaw K, Beltowska K, Dlugosz E. Co-existence of toxoplasmosis and neuroborreliosis - a case report. *Ann Agric Environ Med*. 2005;12(2):305-8.
122. Gustaw K, Beltowska K, Studzinska MM. Neurological and psychological symptoms after the severe acute neuroborreliosis. *Ann Agric Environ Med* 2001;8(1):91-4
123. Gustaw-Rothenberg K. Cognitive impairments after tick-borne encephalitis. *Dement Geriatr Cogn Disord*. 2008;26:165-168.
124. Haass A. Lyme neuroborreliosis. *Curr Opin Neurol*. 1998;11:253-258.
125. Hájek T, Libiger J, Janovská D, Hájek P, Alda M, Höschl C. Clinical and demographic characteristics of psychiatric patients seropositive for *Borrelia burgdorferi*. *Eur Psychiatry*. 2006 Mar;21(2):118-22.
126. Hajek T, Paskova B, Janovska D, Bahbouh R, Hajek P, Libiger J, Hoschl C. Higher prevalence of antibodies to *Borrelia burgdorferi* in psychiatric patients than in healthy subjects. *Am J Psychiatry* 159:297-301, February 2002.
127. Halperin JJ, Luft BJ, Anand AK, Roque CT, Alvarez O, Volkman DJ, Dattwyler RJ. Lyme neuroborreliosis: central nervous system manifestations. *Neurology*. 1989 Jun;39(6):753-9.
128. Halperin JJ. Prolonged Lyme disease treatment: enough is enough. *Neurology* 2008; 70(13): 986-987.
129. Harvey WT, Martz D. Motor neuron disease recovery associated with IV ceftriaxone and anti-Babesia therapy. *Acta Neurol Scand* 2007: 115: 129–131.
130. Hassett AL, Radvanski DC, Buyske S, Savage SV, and Sigal LH. Psychiatric comorbidity and psychological factor in patients with “chronic Lyme disease.” *Am J Med*. 2009; 122(9): 843-850.
131. Hassett AL, Radvanski DC, Buyske S, Savage SV, Gara M, Escobar JI, Sigal LH

- Role of psychiatric comorbidity in chronic Lyme disease. *Arthritis Rheum.* 2008 Dec 15;59(12):1742-9.
132. Helon B, Tluczek TW, Buczyjan A, Adamczyk-Helon A, Wojnarowicz M, Mikula R, Cicinski P, Bojarska J. Polymorphic mental disorders in the course of Lyme borreliosis--case study. *Psychiatr Pol.* 2009 May-Jun;43(3):353-61.
  133. Hernandez-Albujar S, Rubio G, Gopar J, Galeote G, Rey R, Gil A. Parasitic delirium in patient with multiorganic pathology: a complex situation. *An Med Interna* 1996 Nov;13(11):549-51 [Spanish]
  134. Hess A, Buchmann J, Zettl UK, Henschel S, Schlaefke D, Grau G, Benecke R. *Borrelia burgdorferi* central nervous system infection presenting as an organic schizophrenialike disorder. *Biol Psychiatry* 1999 Mar 15;45(6):795
  135. Hodgson R, Belgamwar R, Al-tawarah Y, MacKenzie G The use of atypical antipsychotics in the treatment of schizophrenia in North Staffordshire. *Hum Psychopharmacol.* 2005 Mar;20(2):141-7.
  136. Holtze M, Mickiene A, Atlas A, Lindquist L, Schwieler L. Elevated cerebrospinal fluid kynurenic acid levels in patients with tick-borne encephalitis. *J Intern Med.* 2012; 272: 394-401.
  137. Hovius JWR et al. A case of meningoencephalitis by the relapsing fever spirochaete *Borrelia miyamotoi* in Europe. *Lancet* 2013 Aug 17;382:658.
  138. Hurley RA, Taber KH. Acute and chronic Lyme disease: Controversies for neuropsychiatry. *J Neuropsychiatry Clin Neurosci* 2008;20(1):iv-6.
  139. Iero I, Elia M, Cosentino FI, Lanuzza B, Spada RS, Toscano G, Tripodi M, Belfiore A, Ferri R. Isolated monolateral neurosensory hearing loss as a rare sign of neuroborreliosis. *Neurol Sci.* 2004 Apr;25(1):30-3.
  140. Imai DM, Barr BC, Daft B, Bertone JJ, Feng S, Hodzic E, Johnston JM, Olsen KJ, Barthold SW. Lyme neuroborreliosis in two horses. *Vet Pathol* 2011; 48: 1151-1157.
  141. Issakainen J, Gnehm HE, Lucchini GM, Zbinden R Value of clinical symptoms, intrathecal specific antibody production and PCR in CSF in the diagnosis of childhood Lyme neuroborreliosis. *Klin Padiatr* 1996 May-Jun; 208: 106-109.
  142. Izquierdo G, Aguilar J, Barranquero A, Navarro G, Borobio MV, Angulo S, Domínguez I, Quesada MA. Positive anti-*Borrelia* antibodies in patients with clinical manifestations compatible with neuroborreliosis. *Neurologia.* 1992 Feb;7(2):50-4. Spanish.
  143. Jacek E, Fallon BA, Chandra A, Crow MK, Wormser GP, Alaedini A. Increased IFN $\alpha$  activity and differential antibody response in patients with a history of Lyme disease and persistent cognitive deficits. *J Neuroimmunol.* 2013 Feb 15;255(1-2):85-91. <sup>[1]</sup><sub>SEP</sub>
  144. James FM, Engiles JB, Beech J. Meningitis, cranial neuritis, and radiculoneuritis associated with *Borrelia burgdorferi* infection in a horse. *J Am Vet Med Assoc* 2010; 237: 1180-1185.
  145. Jarskog LF, Mattioli MA, Perkins DO, Lieberman JA. First-episode psychosis in a managed care setting: clinical management and research. *Am J Psychiatry.* 2000 Jun;157(6):878-84.
  146. Jovanovic J, Cvjetkovic D, Vukadinov J. Lyme disease--neuroborreliosis. *Med Pregl.* 1995;48(3-4):120-2.
  147. Juchnowicz D, Rudnik I, Czernikiewicz A, Zajkowska J, Pancewicz SA. Mental disorders in the course of lyme borreliosis and tick borne encephalitis. *Przegl Epidemiol* 2002;56 Suppl 1:37-50 [Polish]
  148. Juchnowicz D, Rudnik I, Czernikiewicz A, Zajkowska J, Pancewicz SA. Mental disorders in the course of lyme borreliosis and tick borne encephalitis. *Przegl Epidemiol.*



- 2002;56 Suppl 1:37-50. Polish.
149. Kaiser B. Neuroborreliosis. *J Neurol.* 1998; 245:247-255
  150. Kanjwal K, Karabin B, Kanjwal Y, Grubb BP. Postural orthostatic tachycardia syndrome following Lyme disease. *Cardiol J.* 2011;18(1):63-6.
  151. Kaplan A. Neuropsychiatric masquerades. *Psychiatr Times* 2009 Feb; 26(2):1-8.
  152. Kaplan RF, Jones-Woodward L, Workman K, Steere AC, Logigian EL, Meadows ME. Neuropsychological deficits in Lyme disease patients with and without other evidence of central nervous system pathology. *Appl Neuropsychol.* 1999;6(1):3-11.
  153. Kaplan RF, Jones-Woodward L. Lyme encephalopathy: a neuropsychological perspective. *Semin Neurol.* 1997 Mar;17(1):31-7.
  154. Kaplan RF, Meadows ME, Vincent LC, Logigian EL, Steere AC. Memory impairment and depression in patients with Lyme encephalopathy: comparison with fibromyalgia and nonpsychotically depressed patients. *Neurology.* 1992 Jul;42(7):1263-7.
  155. Karma A, Stenborg T, Summanen P, Immonen I, Mikkilä H, and Seppälä I. Long-term follow-up of chronic Lyme neuroretinitis. *Retina* 1996; 16: 505-509.
  156. Karma A, Pirttilä TA, Viljanen MK, Lähde YE, Raitta CM. Secondary retinitis pigmentosa and cerebral demyelination in Lyme borreliosis. *Br J Ophthalmol.* 1993 Feb;77(2):120-2.
  157. Karma A, Seppälä I, Mikkilä H, Kaakkola S, Viljanen M, Tarkkanen A. Diagnosis and clinical characteristics of ocular Lyme borreliosis. *Am J Ophthalmol.* 1995 Feb;119(2):127-35.
  158. Keilp JG, Corbera K, Slavov I, Taylor MJ, Sackeim HA, Fallon BA. WAIS-III and WMS-III performance in chronic Lyme disease. *J Int Neuropsychol Soc.* 2006 Jan;12(1):119-29.
  159. Keller TL, Halperin JJ, and Whitman M. PCR detection of *Borrelia burgdorferi* DNA in cerebrospinal fluid of Lyme neuroborreliosis patients. *Neurology* 1992; 43: 32-42.
  160. Kępa L, Oczko-Grzesik B, Badura-Głombik T. Evaluation of cerebrospinal fluid serotonin (5-HT) concentration in patients with post-Lyme disease syndrome--preliminary study *Przeegl Epidemiol.* 2008;62(4):793-800. Polish.
  161. Kobayashi K, Mizukoshi C, Aoki T, Muramori F, Hayashi M, Miyazu K, Koshino Y, Ohta M, Nakanishi I, Yamaguchi N. *Borrelia burgdorferi*-seropositive chronic encephalomyelopathy: Lyme neuroborreliosis? An autopsied report. *Dement Geriatr Cogn Disord.* 1997 Nov-Dec;8(6):384-90.
  162. Kohler J, Kern U, Kasper J, Rhese-Küpper B, Thoden U. Chronic central nervous system involvement in Lyme borreliosis. *Neurology.* 1988 Jun;38(6):863-7.
  163. Kohler J. Lyme borreliosis in neurology and psychiatry. *Fortschr Med.* 1990 Apr 10;108(10):191-3, 197. Review. [German]
  164. Kollikowski HH, Schwendemann G, Schulz M, Wilhelm H, Lehmann HJ. Chronic borrelia encephalomyelorradiculitis with severe mental disturbance: immunosuppressive versus antibiotic therapy. *J Neurol.* 1988 Jan;235(3):140-2.
  165. Koola MM et al. Undiagnosed Lyme disease in adults with schizophrenia. *Schizophrenia Research.* 2015 Oct;168(1-2):579-80.
  166. Krause DL, Norbert Müller N. The relationship between Tourette's syndrome and infections. *Open Neurol J.* 2012; 6: 124-128.
  167. Kristensson K. Microbes' roadmap to neurons. *Nat Rev Neurosci.* 2011 Jun;12(6):345-57.
  168. Krüger H, Heim E, Schuknecht B, Scholz S. Acute and chronic neuroborreliosis with and without CNS involvement: a clinical, MRI, and HLA study of 27 cases. *J*

- Neurol. 1991 Aug;238(5):271-80.
169. Krupp LB, Hyman LG, Grimson R, Coyle PK, Melville P, Ahnn S, Dattwyler R, Chandler B. Study and treatment of post Lyme disease (STOP-LD): a randomized double masked clinical trial. *Neurology*. 2003 Jun 24;60(12):1923-30.
  170. Krupp LB, Masur D, Schwartz J, Coyle PK, Langenbach LJ, Fernquist SK, Jandorf L, Halperin JJ. Cognitive functioning in late Lyme borreliosis. *Arch Neurol*. 1991 Nov;48(11):1125-9.
  171. Krupp LB, Masur D, Schwartz J, Coyle PK, Langenbach IJ, Fernquist SK. Cognitive functioning in late Lyme borreliosis. *Arch Neurol* 1999; 48: 1125-1129.
  172. Kuhn M, Bransfield RC. Divergent opinions of proper Lyme disease diagnosis and implications for children co-morbid with autism spectrum disorder. *Med Hypotheses*. 2014 Sep;83(3):321-5.
  173. Kuhn M, Grave S, Bransfield R, Harris S. Long term antibiotic therapy may be an effective treatment for children co-morbid with Lyme disease and autism spectrum disorder. *Med Hypotheses*. 2012 May;78(5):606-15.
  301. Latov N, Wu AT, Chin RL, Sander HW, Alaedini A, Brannagan TH. Neuropathy and cognitive impairment following vaccination with the OspA protein of *Borrelia burgdorferi*. *J Peripher Nerv Syst* 2004; 9: 165-167.
  174. Lawrence C, Lipton RB, Lowy RD, Coyle PK. Seronegative chronic relapsing neuroborreliosis. *Eur Neurol* 1995; 35(2): 113-117.
  175. Leedy MJ, Jackson M, Callahan JL. Treating depression and compensatory narcissistic personality style in a man with chronic Lyme disease. *Clinical Case Studies*. 2007 Oct; 6(5):430-42.
  176. Legatowicz-Koprowska M, Gziut AI, Walczak E, Gil RJ, Wagner T. Borreliosis-simultaneous Lyme carditis and psychiatric disorders--case report. *Pol Merkur Lekarski*. 2008 May;24(143):433-5. Polish.
  177. Leslie TA, Levell NJ, Cutler SJ, Cann KJ, Smith ME, Wright DJ, Gilkes JJ, Robinson TW. Acrodermatitis chronica atrophicans: a case report and review of the literature. *Br J Dermatol*. 1994 Nov;131(5):687-93.
  178. Levenson JL Psychiatric issues in infectious diseases. *Primary Psychiatry* 2006;13(5):29-32.
  179. Liegner KB, Duray P, Agricola M, Rosenkilde C, Yannuzzi LA, Ziska M, Tilton RC, Hulinska D, Hubbard J, Fallon BA. Lyme disease and the clinical spectrum of antibiotic responsive chronic meningoencephalomyelitis. *J Spiro Tick-Borne Dis* 1997; 4: 61-73.
  180. Listernick R. A 17-year-old boy previously diagnosed with chronic Lyme disease. Patient complained of low-grade fevers, headaches, pharyngitis, and suspected his mother was trying to poison him. *Pediatr Ann*. 2004 Aug;33(8):494-8.
  181. Livengood JA and Gilmore RD, Jr. Invasion of human neuronal and glial cells by an infectious strain of *Borrelia burgdorferi*. *Microbes and Infection*. 2006; 8: 2832-2840.
  182. Lobraico J, Butler A, Petrini J, Ahmadi R. New insights into stages of lyme disease symptoms from a novel hospital-based registry. *J Prim Care Community Health*. 2014 Oct;5(4):284-7.
  183. Logigian EL, Johnson KA, Kijewski MF, Kaplan RF, Becker JA, Jones KJ, Garada BM, Holman BL, Steere AC. Reversible cerebral hypoperfusion in Lyme encephalopathy. *Neurology* 1997 Dec;49(6):1661-70.
  184. Logigian EL, Kaplan RF, Steere AC Chronic neurologic manifestations of Lyme disease. *N Engl J Med*. 1990 Nov 22;323(21):1438-44.
  185. Logigian EL, Kaplan RF, Steere AC. Successful treatment of Lyme encephalopathy with intravenous ceftriaxone. *J Infect Dis*. 1999 Aug;180(2):377-83.

186. Luft BJ, Steinman CR, Neimark HC, Muralidhar B, Rush T, Finkel MF, Kundel M, Dattwyler RJ. Invasion of the CNS by *Borrelia burgdorferi* in acute disseminated infection. *JAMA* 1992; 267: 1364-1367.
187. Maillefert JF, Dardel P, Piroth C, Tavernier C. Mental nerve neuropathy in Lyme disease. *Rev Rhum Engl Ed.* 1997 Dec;64(12):855.
188. Maimone D, Villanova M, Stanta G, Bonin S, Malandrini A, Guazzi GC, Annunziata P. Detection of *Borrelia burgdorferi* DNA and complement membrane attack complex deposits in the sural nerve of a patient with chronic polyneuropathy and tertiary Lyme disease. *Muscle Nerve.* 1997 Aug;20(8):969-75.
189. Markeljević J, Sarac H, Rados M. Tremor, seizures and psychosis as presenting symptoms in a patient with chronic Lyme neuroborreliosis (LNB). *Coll Antropol.* 2011 Jan;35 Suppl 1:313-8.
190. Mascarelli PE, Maggi RG, Hopkins S, Mozayeni BR, Trull CL, Bradley JM, Hegarty BC, Breitschwerdt EB. *Bartonella henselae* infection in a family experiencing neurological and neurocognitive abnormalities after woodlouse hunter spider bites. *Parasites Vectors* 2013; 6:98.
191. Matera G, Labate A, Quirino A, Lamberti AG, Borzã G, Barreca GS, Mumoli L, Peronace C, Giancotti A, Gambardella A, Foca A, Quattrone A. Chronic neuroborreliosis by *B. garinii*: an unusual case presenting with epilepsy and multifocal brain MRI lesions. *New Microbiol.* 2014 Jul;37(3):393-7
192. Mattsson N, Bremell D, Anckarsater R, Blennow K, Anckarsater H, Zetterberg H, Hagberg L. Neuroinflammation in Lyme neuroborreliosis affects amyloid metabolism. *BMC Neurol.* 2010 Jun 22;10(1):51
193. Mattsson N, Bremell D, Anckarsater R, Blennow K, Anckarsater H, Zetterberg H, Hagberg L. Neuroinflammation in Lyme neuroborreliosis affects amyloid metabolism. *BMC Neurology* 2010, 10:51.
194. McAuliffe P, Brassard MR, Fallon B. Memory and executive functions in adolescents with posttreatment Lyme disease. *Applied Neuropsych.* 2008; 15:208-219
195. Merlo A, Weder B, Ketz E, Matter L. Locked-in state in *Borrelia burgdorferi* meningitis. *J Neurol.* 1989;236:305-306.
196. Mikkilä H, Seppälä I, Leirisalo-Repo M, Immonen I, Karma A. The etiology of uveitis: the role of infections with special reference to Lyme borreliosis. *Acta Ophthalmol Scand.* 1997 Dec;75(6):716-9.
197. Mikkilä HO, Seppälä IJ, Viljanen MK, Peltomaa MP, Karma A. The expanding clinical spectrum of ocular Lyme borreliosis. *Ophthalmology.* 2000 Mar;107(3):581-7.
198. Miklossy J, Donta S, Mueller K, Nolte O, Perry G. Chronic or late Lyme neuroborreliosis: Present and future. *Open Neurology J.* 2012; 6:78.
199. Millner M. Neurologic manifestations of Lyme borreliosis in children. *Wien Med Wochenschr* 1995; 145 (7-8): 178-182.
200. Möhrenschrager M, Köhn FM, Bauer M, Schaaf L, Hofmann H, Ring J. Late Lyme disease masking a non-functioning adenoma of the anterior lobe of the pituitary gland. *Andrologia.* 2002 Jun;34(3):162-3.
201. Mokry M, Flaschka G, Kleinert G, Kleinert R, Fazekas F, Kopp W. Chronic Lyme disease with an expansive granulomatous lesion in the cerebellopontine angle. *Neurosurgery.* 1990 Sep;27(3):446-51.
202. Morgen K, Martin R, Stone RD, Grafman J, Kadom N, McFarland HF, Marques A. FLAIR and magnetization transfer imaging of patients with post-treatment Lyme disease syndrome. *Neurology.* 2001 Dec 11;57(11):1980-5.
203. Morris G, Berk M, Walder K, Maes M. The putative role of viruses, bacteria, and chronic fungal biotoxin exposure in the genesis of intractable fatigue accompanied by

- cognitive and physical disability. *Mol Neurobiol.* 2016 May;53(4):2550-71.
204. Moses JM, RS Riseberg, and JM Mansbach. Lyme disease presenting with persistent headache. *Pediatrics* 2003; 112: 477-449.
205. Muller M, Retzl J, Plank E, Scholz H, Ziervogel H, Stanek G. Prevalence of *Borrelia burgdorferi* serum antibodies in 651 patients with predominantly neurologic diseases. *Wien Klin Wochenschr.* 1993;105(21):599-602.
206. Muller N, Riedel M, Straube A, Gunther W, Wilske B. Increased anti-streptococcal antibodies in patients with Tourette's syndrome. *Psychiatry Res.* 2000 Apr 24;94(1):43-9.
207. Murray R, Morawetz R, Kepes J, el Gammal T, LeDoux M. Lyme neuroborreliosis manifesting as an intracranial mass lesion. *Neurosurgery.* 1992 May;30(5):769-73.
208. Nadelman RB, Herman E, Wormser GP. Screening for Lyme disease in hospitalized psychiatric patients: prospective serosurvey in an endemic area. *Mt Sinai J Med.* 1997 Nov;64(6):409-12.
209. Newberg A, Hassan A, Alavi A. Cerebral metabolic changes associated with Lyme disease *Nucl Med Commun* 2002 August;23(8):773-777
210. Nicolson GL Chronic bacterial and viral Infections in neurodegenerative and neurobehavioral diseases. *Lab Medicine.* 2008;39(5):291-9.
211. Nicolson GL, Gann R, Nicolson NL, Haier J. Evidence for *Mycoplasma*, ssp., *Chlamydia pneumoniae*, and Human Herpes-virus 6 coinfections in blood of patients with autistic spectrum disorders. *J Neurosci Res* 2007 Apr;85(5):1143-8. [SEP]
212. Nicolson GL, Haier J. Role of chronic bacterial and viral infections in neurodegenerative, neurobehavioral, psychiatric, autoimmune and fatiguing illnesses. *Br J Med Pract.* 2009;2(4)20-8.
213. Nields JA, Fallon BA, Jastreboff PJ. Carbamazepine in the treatment of Lyme disease-induced hyperacusis. *J Neuropsychiatry Clin Neurosci* 1999 Winter;11(1):97-9
214. Nields JA, Fallon BA. Differential diagnosis and treatment of Lyme disease with special reference to psychiatric practice. *Directions Psychiatry,* 1998; 18: 209-228.
215. Nields JA, Kueton JF. Tullio phenomenon and seronegative Lyme borreliosis. *Lancet.* 1991 Jul 13;338:128-9 .
216. Nocton JJ, Bloom BJ, Rutledge BJ, Persing DJ, Logigian EL, Schmid CH, Steere AC. Detection of *Borrelia burgdorferi* DNA by polymerase chain reaction in cerebrospinal fluid in Lyme neuroborreliosis. *J. Infect Dis* 1996; 174: 623-627.
217. Oglodek E, Mos D, Araszkievicz A. Coexisting of borreliosis, depression and psoriasis--case report. *Pol Merkur Lekarski.* 2010 Jan;28(163):53-5.
218. Oksi J, Kalimo H, Marttila RJ, Marjarnaki M, Sonninen P, Nikoskelainen J, Viljanen MK. Inflammatory brain changes in Lyme Borreliosis. A report on three patients and review of literature. *Brain.* 1996 Dec; 119 (Pt 6) : 2143-2154
219. Omasits M, Seiser A, Brainin M. Recurrent and relapsing course of borreliosis of the nervous system. *Wien Klin Wochenschr.* 1990 Jan 5;102(1):4-12. Review.
220. P. Hildenbrand, D.E. Craven, R. Jone et al. Lyme Neuroborreliosis: Manifestations of a rapidly emerging zoonosis. *Am J Neuroradiol* 2009;30:1079-87.
221. Pachner AR. Early disseminated Lyme disease: Lyme meningitis. *Am J Med.* 1995; 98(4A):30S-37S
222. Pachner AR. *Borrelia burgdorferi* in the nervous system: the new "great imitator". *Ann N Y Acad Sci.* 1988;539:56-64.
223. Pachner AR, Duray P, Steere AC. Central nervous system manifestations of Lyme disease. *Arch Neurol.* 1989 Jul;46(7):790-5.

224. Pachner AR, Steiner I. Lyme neuroborreliosis: infection, immunity and inflammation. *Lancet Neurol* 2007; 6:544- 52.
225. Pachner AR. Neurologic manifestations of Lyme disease, the new "great imitator". *Rev Infect Dis*. 1989 Sep-Oct;11 (Suppl 6):S1482-6.
226. Paparone PW. Neuropsychiatric manifestations of Lyme disease. *J Am Osteopath Assoc* 1998 Jul;98(7):373-8
227. Pasareanu AR, Mygland Å, Kristensen Ø. A woman in her 50s with manic psychosis. *Tidsskr Nor Laegeforen*. 2012 Mar 6;132(5):537-9.
228. Petrovic M, Vogelaers D, Van Renterghem L, De Reuck J, Afschrift M. Lyme borreliosis - A review of the late stages and treatment of four cases. *Acta Clinica Belgica* 1998;53-3:178-183.
229. Pfister HW, Preac-Mursic V, Wilske B, Rieder G, Forderreuther S, Schmidt S, Kapfhammer HP. Catatonic syndrome in acute severe encephalitis due to *Borrelia burgdorferi* infection. *Neurology*. 1993 Feb;43(2):433-5.
230. Plutchok JJ, Tikofsky RS, Liegner K, Kochevar JM, Fallon BA, Van Heertum RL. Tc-99m HMPAO Brain SPECT imaging in chronic Lyme disease. *J Spiro Tick-borne Dis* 1999; 6: 117-122.
231. Plutchok JJ, Tikofsky RS, Liegner KB, Fallon BA, Van Heertum RL. Brain SPECT imaging in chronic Lyme disease. *J Spiro Tick Borne-Dis*. 1999; 6: 10-16.
232. Pollina DA, Elkins LE, Squires NK, Scheffer SR, Krupp LB. Does process-specific slowing account for cognitive deficits in Lyme disease? *Appl Neuropsychol*. 1999;6(1):27-32.
233. Pollina DA, Sliwinski M, Squires NK, Krupp LB. Cognitive processing speed in Lyme disease. *Neuropsychiatry Neuropsychol Behav Neurol*. 1999 Jan;12(1):72-8.
234. Poplawska R, Konarzewska B, Gudel-Trochimowicz I, Szulc A. Psychologic disorders in acute and persistent neuroborreliosis. *Pol Merkuriusz Lek* 2001 Jan;10(55):36-7
235. Poplawska R, Szulc A, Zajkowska J, Pancewicz S. Neuroborreliosis: a psychiatric problem? *Psychiatr Pol* 1999 Mar- Apr;33(2):241-50.
236. Preac-Mursic V, Wilske B, Schierz G, et al. Repeated isolation of spirochetes from the cerebrospinal fluid of a patient with meningoradiculitis (Bannwarth syndrome). *Eur J Clin Microbiol* 1984; 3: 564-565.
237. Primavera A, Gazzola P, De Maria AF. Neuropsychological deficits in neuroborreliosis. *Neurology*. 1999 Sep 11;53(4):895-6.
238. Puri BK, Shah M, Julu PO, Kingston MC, Monro JA. The association of lyme disease with loss of sexual libido and the role of urinary bladder detrusor dysfunction. *Int Neurol J*. 2014 Jun;18(2):95-7.
239. Quinn SJ, Boucher BJ, Booth JB. Reversible sensorineural hearing loss in Lyme disease. *J Laryngol Otol*. 1997 Jun;111(6):562-4.
240. Ragnaud JM, Morlat P, Buisson M, Ferrer X, Orgogozo JM, Julien J, Beylot J, Aubertin J. Neurologic manifestations of Lyme disease. Apropos of 25 cases. *Rev Med Interne*. 1995;16(7):487-94.
241. Ramanan SV. Loss of the sense of humor. *Arch Intern Med* 2000 Sep 11;160(16):2546 .
242. Ramesh G, Didier PJ, England JD, et al. Inflammation in the pathogenesis of Lyme neuroborreliosis. *Am J Pathol*. 2015 May;185(5):1344-60.
243. Ramesh R, Borda JT, Dufor J, Kaushal D, Ramamoorthy R, Lackner AA, Philipp MT. Interaction of the Lyme disease spirochete *Borrelia burgdorferi* with brain parenchyma elicits inflammatory mediators from glial cells as well as glial and neuronal

- apoptosis. *Am J Pathol.* 2008; 173:1415-27<sup>[SEP]</sup>.
244. Ratnasamy N, Everett ED, Roland WE, McDonald G, Caldwell CW. Central nervous system manifestations of human ehrlichiosis. *Clin Infect Dis* 1996 Aug;23(2):314-9
245. Reddy KP, McCannon JB, Venna N. Diaphragm paralysis in Lyme disease: late occurrence in the course of treatment and long-term recovery. *Ann Am Thorac Soc.* 2015 Apr;12(4):618-20.
246. Reik L, Steere AC, Bartenhagen NH, Shope RE, Malawista SE. Neurologic abnormalities of Lyme disease. *Medicine (Baltimore).* 1979 Jul;58(4):281-94.
247. Rhee H, Cameron DJ. Lyme disease and pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (PANDAS): an overview. *Int J Gen Med.* 2012;5: 163-174.
248. Riedel M, Straube A, Schwarz MJ, Wilske B, Muller N. Lyme disease presenting as Tourette's syndrome. *Lancet.* 1998 Feb 7;351(9100):418-9
249. Roche Lanquetot R, Ader F, Durand MC, Carlier R, Defferriere H, Dinh A, Herrmann JL, Guillemot D, Perronne C, Salomon J. Results of a prospective standardized study of 30 patients with chronic neurological and cognitive disorders after tick bites. *Med Mal Infect.* 2008 Oct;38(10):543-8.
250. Roelcke U, Barnett W, Wilder-Smith E, Sigmund D, Hacke W. Untreated neuroborreliosis: Bannwarth's syndrome evolving into acute schizophrenia-like psychosis. A case report. *J Neurol.* 1992 Mar;239(3):129-31
251. Rudnik I, Konarzewska B, Zajkowska J, Juchnowicz D, Markowski T, Pancewicz SA The organic disorders in the course of Lyme disease. *Pol Merkuriusz Lek.* 2004 Apr;16(94):328-31
252. Rudnik I, Poplawska R, Zajkowska J, Konarzewska B, Juchnowicz D, Pancewicz SA. Mental problems in Lyme disease. *Pol Merkuriusz Lek.* 2003 Aug;15(86):161-4
253. Rudnik-Szalaj I, Poplawska R, Zajkowska J, Szulc A, Pancewicz SA, Gudel I. Mental disorders in Lyme disease. *Pol Merkuriusz Lek.* 2001 Nov;11(65):460-2.
254. Rundell JR, Wise MG. Neurosyphilis: a psychiatric perspective. *Psychosomatics.* 1985; 26: 287-295.
255. Samuel B, Axelband J, Mckim K, Leh D. *Borrelia burgdorferi*: A clinical chameleon. *Consultant.* 2015;55(7):530-535.
256. Sanders K, Rogers JD. Lyme encephalopathy. *Neurology.* 1991 Jun;41(6):952-3.
257. Savely VR. Update on Lyme disease: the hidden epidemic. *J Infus Nurs.* 2008 Jul-Aug;31(4):236-40.
258. Schaller JL, Burkland GA, Langhoff PJ. Do bartonella infections cause agitation, panic disorder, and treatment-resistant depression? *MedGenMed.* 2007 Sep 13;9(3):54.
259. Scerpella TA, Engber WD. Chronic Lyme disease arthritis: review of the literature and report of a case of wrist arthritis. *J Hand Surg Am.* 1992 May;17(3):571-5.
260. Scheffer RE, Linden S. Concurrent medical conditions with pediatric bipolar disorder. *Curr Opin Psychiatry.* 2007 Jul;20(4):398-401. Review.
261. Schneider RK, Robinson MJ, Levenson JL. Psychiatric presentations of non-HIV infectious diseases. *Psychiatr Clin North Am* 2002 Mar;25(1):1-16
262. Schoof J, Kluge C, Heinze HJ, Galazky I. Startle myoclonus induced by Lyme neuroborreliosis: a case report. *J Med Case Rep* 2013(May); 7(1): 124. DOI: 10.1186/1752-1947-7-124
263. Schuler PA. Gifted Students and Lyme Disease: What Educators, Counselors, and Parents Need to Know. *Gifted Child Today* 2013 36: 35. DOI:

10.1177/1076217512465288

264. Shadick NA, Phillips CB, Logigian EL, Steere AC, Kaplan RF, Berardi VP, Duray PH, Larson MG, Wright EA, Ginsburg KS, Katz JN, Liang MH. The long-term clinical outcomes of Lyme disease. A population-based retrospective cohort study. *Ann Intern Med.* 1994 Oct 15;121(8):560-7.
265. Shamim A, Shamim S; Liss G; Nylen E; Pincus J; Yepes M. Constipation heralding Neuroborreliosis *Arch Neurol.* 2005;62:671-673.
266. Sherr VT. Human babesiosis--an unrecorded reality. *Med Hypotheses.* 2004;63(4):609-15
267. Sherr VT. Munchausen's syndrome by proxy and Lyme disease: medical misogyny or diagnostic mystery? *Med Hypotheses.* 2005;65(3):440-7.
268. Sherr VT. Panic attacks may reveal previously unsuspected chronic disseminated Lyme disease. *J Psychiatr Pract.* 2000 Nov;6(6):352-6.
269. Shotland LI, Mastrianni MA, Choo DL, Szymko-Bennett YM, Dally LG, Pikus AT, Sledjeski K, Marques A. Audiologic manifestations of patients with post-treatment Lyme disease syndrome. *Ear Hear.* 2003 Dec;24(6):508-17
270. Smith AJ, Oertle J, Prato D. *Borrelia burgdorferi*: Cell biology and clinical manifestations in latent chronic Lyme. *Open J Med Microbiol.* 2014;4:210-223.
271. Smith IS, Rechlin DP. Delayed diagnosis of neuroborreliosis presenting as bell palsy and meningitis. *J Am Osteopath Assoc.* 2010 Aug;110(8):441-4.
272. Smith V, Traquina DN. Pediatric bilateral facial paralysis. *Laryngoscope.* 1998 Apr;108(4 Pt 1):519-23.
273. Sno HN. Signs and significance of a tick-bite: psychiatric disorders associated with Lyme disease. *Tijdschr Psychiatr.* 2012;54(3):235-43.
274. Sparsa L, Blanc F, Lauer V, Cretin B, Marescaux C, Wolff V. Recurrent ischemic strokes revealing Lyme meningovascularitis. *Rev Neurol (Paris).* 2009 Mar;165(3):273-7.
275. Staci D, BilboSD, Jaclyn M, Schwarz JM. Early-life programming of later-life brain and behavior: a critical role for the immune system. *Frontiers in Behavioral Neurosciences.* 2009;3
276. Steere AC. A 58-year-old man with a diagnosis of chronic Lyme disease, 1 year later. *JAMA.* 2002 Aug 28;288(8):1002- 10.
277. Stein SL, Solvason HB, Biggart E, Spiegel D. A 25-year-old woman with hallucinations, hypersexuality, nightmares, and a rash. *Am J Psychiatry.* 1996 Apr;153(4):545-51.
278. Steinberg SH, Strickland GT, Pena C, Israel E. Lyme disease surveillance in Maryland, 1992. *Ann Epidemiol.* 1996 Jan;6(1):24-9.
279. Stratmoen M. Neurological complications of Lyme disease: Dilemmas in Diagnosis and Treatment. *Neurology Today* 2004;4(4)71-5.
280. Stricker RB, Winger EE. Holmes-Adie syndrome and Lyme disease. *Lancet.* 2001 Mar 10;357(9258):805.
281. Stricker RB, Winger EE. Musical hallucinations in patients with Lyme disease. *South Med J* 2003; 96(7):711- 715 .
282. Stricker RB, Green CL, Savely VR, Chamallas SN, Johnson L. Safety of intravenous antibiotic therapy in patients referred for treatment of neurologic Lyme disease. *Minerva Med.* 2010 Feb;101(1):1-7. [L]  
[SEP]
283. Stricker RB, DeLong AK, Green CL, Savely VR, Chamallas SN, Johnson L. Benefit of intravenous antibiotic therapy in patients referred for treatment of neurologic Lyme disease. *Int J Gen Med* 2011; 4: 639-646.

284. Stricker RB, Johnson L. Anti-neural antibody reactivity in patients with a history of Lyme borreliosis and persistent symptoms. *Brain Behavior Immun.* 2010;24: 1025 .
285. Sumiya H, Kobayashi K, Mizukoshi C, Aoki T, Koshino Y, Taki J, Tonami N. Brain perfusion SPECT in Lyme neuroborreliosis. *J Nucl Med.* 1997 Jul;38(7):1120-2.
286. Svetina C, Barr WB, Rastogi R, Hilton E. The neuropsychological examination of naming in Lyme borreliosis. *Appl Neuropsychol.* 1999;6(1):33-8.
287. Tager FA, Fallon BA, Keilp J, Rissenberg M, Jones CR, Liebowitz MR. A controlled study of cognitive deficits in children with chronic Lyme disease. *J Neuropsychiatr Clin Neurosci* 2001;13:500-507.
288. Tager FA, Fallon BA. Psychiatric and cognitive features of Lyme disease. *Psychiatr Ann* 2001; 31: 173-181.
289. Treib J, Grauer MT, Haass A, Langenbach J, Holzer G, Woessner R. Chronic fatigue syndrome in patients with Lyme borreliosis. *Eur Neurol.* 2000;43(2):107-9.
290. Vamos E, Pardutz A, Klivenyi P, Toldi J, Vecsei L The role of kynurenines in disorders of the central nervous system: Possibilities for neuroprotection. *J Neurol Sci.* 2009 Mar 4.
291. van den Bergen HA, Smith JP, van der Zwan A. Lyme Psychosis. *Ned Tijdschr Geneeskd* 1993 Oct 9;137(41):2098-100.
292. Vázquez M, Sparrow SS, and Shapiro ED. Long-term neuropsychologic and health outcomes of children with facial nerve palsy attributable to Lyme disease. *Pediatrics* 2003; 112(2): e93-e97.
293. Vital C, Vital A, Lagueny A, Larribau E, Saintarailles J, Julien J. Subacute inflammatory polyneuropathy: two cases with plasmacytoid histiocytes in the endoneurium. *Ultrastruct Pathol.* 1998 Sep-Oct;22(5):377-83.
294. Volkman D Anti-neural antibody reactivity in patients with a history of Lyme borreliosis and persistent symptoms. *Brain Behavior Immun.* 2010;24:1026.
295. Waniek C, Prohovnik I, Kaufman MA, Dwork AJ. Rapidly progressive frontal-type dementia associated with Lyme disease. *J Neuropsychiatry Clin Neurosci* 1995;7(3):345-7.
296. Weder B, Wiedersheim P, Matter L, Steck A, Otto F. Chronic progressive neurological involvement in *Borrelia burgdorferi* infection. *J Neurology* 1987;234:40-43.
297. Weissenbacher S, Ring J, Hofmann H. Gabapentin for the symptomatic treatment of chronic neuropathic pain in patients with late-stage Lyme borreliosis: a pilot study. *Dermatology.* 2005;211(2):123-7.
298. Westervel HJ, McCaffrey RJ. Neuropsychological functioning in chronic Lyme disease. *Neuropsychol Rev* 2002 Sep;12(3):153-77 Review.
299. Wilke M, Eiffert H, Christen HJ, Hanefeld F. Primarily chronic and cerebrovascular course of Lyme neuroborreliosis: case reports and literature review. *Arch Dis Child.* 2000 Jul;83(1):67-71. Review.
300. Woessner R, Treib J. Pain, fatigue, depression after borreliosis. Antibiotics used up--what next? *MMW Fortschr Med.* 2003 Sep 18;145(38):45-8.
301. Wokke JHJ, van Gijn J, Elderson A, Stanek G. Chronic forms of *Borrelia burgdorferi* infection of the nervous system. *Neurology* 1987;37:1031-1034.
302. Yolken RH, Torrey EF. Are some cases of psychosis caused by microbial agents? A review of the evidence. *Mol Psychiatry.* 2008 May;13(5):470-9.
303. Younger DS, Rosoklija G, Hays AP. Persistent painful Lyme radiculoneuritis. *Muscle Nerve.* 1995 Mar;18(3):359-60.
304. Zajkowska JM, Hermanowska-Szpakowicz T, Kondrusik M, Pancewicz SA. Neurologic syndromes in Lyme disease. *Pol Merkuriusz Lek.* 2000 Aug;9(50):584-8. Review.



305. Zajkowska JM, Poplawska R, Pancewicz SA, Kondrusik M, Gudel I, Snarska I. Mental disorders in the course of neuroborreliosis: own observation. *Psychiatr Pol* 1999 Nov-Dec;33(6):939-46.
306. Zamponi N, Cardinali C, Tavoni MA, Porfiri L, Rossi R, Manca A. Chronic neuroborreliosis in infancy. *Ital J Neurol Sci.* 1999; 20:303-307.
307. Zhang Y, Lafontant G, Bonner FJ Jr. Lyme neuroborreliosis mimics stroke: a case report. *Arch Phys Med Rehabil.* 2000 Apr;81(4):519-21.

## **Tick-Borne Diseases and Dementia**

1. Aboul-Enein F, Kristoferitsch W. Normal pressure hydrocephalus or neuroborreliosis? *Wien Med Wochenschr.* 2009;159(1-2):58-61.
2. *Annals of the New York Academy of Sciences, Lyme Disease and Related Disorders.* 539, 468–470.
3. Bannwarth, A. Zur Klinik und Pathogenese der chronischen lymphocytären Meningitis. *Arch Psychiatr Nervenkr.* 1944;117: 161- 185.
4. Blanc F, Philippi N, Cretin B, Kleitz C, Berly L, Jung B, Kremer S, Namer IJ, Sellal F, Jaulhac B, de Seze J. Lyme neuroborreliosis and dementia. *J Alzheimers Dis.* 2014; 41(4): 1087-93.
5. Bransfield RC. The diagnosis of Lyme disease. *Hosp Pract.* 1996 Aug 15;31(8):35, 40.
6. Duyckaerts C, Delatour B, Potier MC. Classification and basic pathology of Alzheimer disease. *Acta Neuropathol* 2009;118, 5-36
7. Galbussera A, Tremolizzo L, Isella V, et al. Lack of evidence for *Borrelia burgdorferi* seropositivity in Alzheimer disease. *Alzheimer Dis Assoc Disord* 2008;22(3), 308.
8. Guo JP, Arai T, Miklossy J, McGeer PL. A $\beta$  and tau form soluble complexes that may promote self aggregation of both into the insoluble forms observed in Alzheimer's disease. *Proc Natl Acad Sci U S A.* 2006 Feb 7;103(6):1953-8.
9. Haass C, Selkoe DJ. Soluble protein oligomers in neurodegeneration: lessons from the Alzheimer's amyloid beta-peptide. *Nat Rev Mol Cell Biol* 2007;8: 101-12.
10. Hardy J, Selkoe DJ. The amyloid hypothesis of Alzheimer's disease: progress and problems on the road to therapeutics. *Science* 2002;297: 353-6
11. Holmes C, Cotterell D. Role of infection in the pathogenesis of Alzheimer's disease: implications for treatment. *CNS Drugs* 2009;23(12): 993-1002.
12. Honjo K, van Reekum R, Verhoeff NP. Alzheimer's disease and infection: Do infectious agents contribute to progression of Alzheimer's disease? *Alzheimers Dement.* 2009;5: 348-360 .
13. Itzhaki RF, Lathe R, Balin BJ, Ball MJ, Bearer EL, Braak H, Bullido MJ, Carter C, Clerici M, Cosby SL, Del Tredici K, Field H, Fulop T, Grassi C, Griffin WS, Haas J, Hudson AP, Kamer AR, Kell DB, Licastro F, Letenneur L, Lövheim H, Mancuso R, Miklossy J, Oth C, Palamara AT, Perry G, Preston C, Pretorius E, Strandberg T, Tabet N, Taylor-Robinson SD, Whittum-Hudson JA. Microbes and Alzheimer's Disease. *J Alzheimers Dis.* 2016;51(4):979-84.
14. Jack CR Jr, Knopman DS, Jagust WJ, Shaw LM, Aisen PS, Weiner MW, Petersen RC, Trojanowski JQ. Hypothetical model of dynamic biomarkers of the Alzheimer's pathological cascade. *Lancet Neurol* 2010;9:119-28.
15. Khan UA, Liu L, Provenzano FA, Berman DE, Profaci CP, Sloan R, Mayeux R, Duff KE, Small SA. Molecular drivers and cortical spread of lateral entorhinal cortex dysfunction in preclinical Alzheimer's disease. *Nat Neurosci.* 2014 Feb;17(2):304-11.

16. Lue LF, Kuo YM, Roher AE, Brachova L, Shen Y, Sue L, Beach T, Kurth JH, Rydel RE, Rogers J. Soluble amyloid beta peptide concentration as a predictor of synaptic change in Alzheimer's disease. *Am J Pathol* 1999;155: 853-862
17. MacDonald AB. Concurrent neocortical Borreliosis and Alzheimer's disease: Demonstration of a spirochetal cyst form. *Ann NY Acad Sci* 1988;539:468-470.
18. MacDonald AB, Miranda JM. Concurrent neocortical borreliosis and Alzheimer's disease. *Human Pathol* 1987; 18: 759-761.
19. MacDonald AB. Concurrent neocortical borreliosis and Alzheimer's disease: demonstration of a spirochetal cyst form. *Ann NY Acad Sci* 1988; 539: 468-470.
20. MacDonald AB, Berger BW, and Schwan TG. Clinical implications of delayed growth of the Lyme disease spirochete, *Borrelia burgdorferi*. *Acta Trop* 1990 48; (2): 89-94.
21. MacDonad AB. In situ DNA hybridization study of granulovacuolar degeneration in human Alzheimer autopsy neurons for flagellin b transcriptomes of *Borrelia burgdorferi*. *Alzheimer's Dis Dementia* 2006; 2 (Suppl. 1): S207.
22. MacDonald AB. Cystic borrelia in Alzheimer's disease and in non-dementia neuroborreliosis. *Alzheimer's Dementia* 2006; 2 (Suppl. 1):S433.
23. MacDonald AB. Plaques of Alzheimer's disease originate from cysts of *Borrelia burgdorferi*, the Lyme disease spirochete. *Med Hypotheses*. 2006;67(3):592-600.
24. MacDonald AB. Spirochetal cyst forms in neurodegenerative disorders...hiding in plain sight. *Med Hypotheses*. 2006;67(4):819-32. Epub 2006 Jul 7.
25. MacDonald AB. Transfection "Junk" DNA - a link to the pathogenesis of Alzheimer's disease? *Med Hypotheses*. 2006;66(6):1140-1.
26. MacDonald AB. Alzheimer's neuroborreliosis with trans-synaptic spread of infection and neurofibrillary tangles derived from intraneuronal spirochetes. *Med Hypotheses* 2007; 68: 822-825. [7 of 10 cases of Alzheimer's disease had *B. burgdorferi* in their brains].
27. MacDonald AB. Alzheimer's disease Braak Stage progressions reexamined and redefined as *Borrelia* infection transmission through neural circuits. *Med Hypotheses*. 2007; 68(5): 1059-64
28. MacDonald AB, Miranda JM. Concurrent neocortical borreliosis and Alzheimer's disease. *Hum Pathol*. 1987 Jul;18(7):759-61.
29. MacDonald AB. Plaques of Alzheimer's disease originate from cysts of *Borrelia burgdorferi*, the Lyme disease spirochete. *Med Hypotheses*. 2006;67(3):592-600.
30. Macdonald AB. Transfection "junk" DNA - A link to the pathogenesis of Alzheimer's disease? *Medical Hypothesis*. 2006;66(6):1140-1.
31. MacDonald AB. *Borrelia* in the brains of patients dying with dementia. *JAMA*. 1986;256:2195-2196.
32. MacDonald AB. Alzheimer's neuroborreliosis with trans-synaptic spread of infection and neurofibrillary tangles derived from intraneuronal spirochetes. *Med Hypotheses*. 2007;68(4):822-5. Epub 2006 Oct 20.
33. MacDonald AB. Concurrent neocortical borreliosis and Alzheimer's disease: Demonstration of a spirochetal cyst form. *Ann N Y Acad Sci* 1988; 539:468-470.
34. McLaughlin R, Kin NM, Chen MF, et al. Alzheimer's disease may not be a spirochetosis. *Neuroreport* 1999;10(7), 1489-91.
35. Meer-Scherrer L, Chang Loa C, Adelson ME, Mordechai E, Lobrinus JA, Fallon BA, Tilton RC. Lyme disease associated with Alzheimer's disease. *Curr Microbiol*. 2006 Apr;52(4):330-2.
36. Miklossy J. Alzheimer's disease — a spirochetosis? *NeuroReport* 1993; 4: 841-848.
37. Miklossy J, Gern L, Darekar P, Janzer RC, Loos H. Senile plaques, neurofibrillary tangles and neuropil threads contain DNA? *J Spiro Tick-borne Dis* 1995; 2: 1-5.
38. Miklossy JM, Khalili K, Gern L, Ericson RL, Darekar P, Bolle L, Hurlimann J, and

- Paster BJ. *Borrelia burgdorferi* persists in the brain in chronic Lyme neuroborreliosis and may be associated with Alzheimer's disease. *J Alzheimers Dis* 2004; 6: 639-649.
39. Miklossy J. Chronic inflammation and amyloidogenesis in Alzheimer's disease — role of spirochetes. *J Alzheimers Dis* 2008; 13: 381-391.
  40. Miklossy J, Kasas S, Zurn AD, McCall S, Yu S, and McGeer PL. Persisting atypical and cystic forms of *Borrelia burgdorferi* and local inflammation in Lyme neuroborreliosis. *J Neuroinflammation* 2008; 5: 40-57.
  41. Miklossy J. Chronic or late Lyme neuroborreliosis: analysis of evidence compared to chronic or late neurosyphilis. *Open Neurol J* 2012;6: 146-157.
  42. Miklossy J. Chronic inflammation and amyloidogenesis in Alzheimer's disease -- role of spirochetes. *Alzheimers Dis*. 2008 May;13(4):381-91. Review.
  43. Miklossy J. Alzheimer's disease - a neurospirochetosis. Analysis of the evidence following Koch's and Hill's criteria. *J Neuroinflammation*. 2011 Aug 4;8(1):90.
  44. Miklossy J. Historic evidence to support a causal relationship between spirochetal infections and Alzheimer's disease. *Frontiers Aging Neurosci*. 2015 Apr 16;7:46.
  45. Miklossy J. Bacterial amyloid and DNA are important constituents of senile plaques: Further evidence of the spirochetal and biofilm nature of senile plaques. *J Alzheimer's Dis*. 2016;53:1459-1473.
  46. Miklossy J. Emerging roles of pathogens in Alzheimer disease. *Expert Rev Mol Med*. 2011 Sep 20;13:e30.
  47. Miklossy J, Donta SE, Mueller K, Nolte O, Perry G. Chronic or late Lyme neuroborreliosis: present and future. *Open Neurol J*. 2012;6:78.
  48. Miklossy J, Kasas S, Janzer RC, Ardizzoni F, Van der Loos H. Further ultrastructural evidence that spirochaetes may play a role in the aetiology of Alzheimer's disease. *Neuroreport*. 1994 Jun 2;5(10):1201-4.
  49. Miklossy J, Kasas S, Zurn AD, McCall S, Yu S, McGeer PL. Persisting atypical and cystic forms of *Borrelia burgdorferi* and local inflammation in Lyme neuroborreliosis. *J Neuroinflammation*. 2008;5: 40.
  50. Miklossy J, Khalili K, Gern L, Ericson RL, Darekar P, Bolle L, Hurlimann J, Paster BJ. *Borrelia burgdorferi* persists in the brain in chronic Lyme neuroborreliosis and may be associated with Alzheimer disease. *J Alzheimer's Disease* 2004;6 (6): 639-49; discussion 673-681.
  51. Miklossy J, Kris A, Radenovic A, Miller L, Forro L, Martins R, Reiss K, Darbinian N, Darekar P, Mihaly L, Khalili K. Beta-amyloid deposition and Alzheimer's type changes induced by *Borrelia* spirochetes. *Neurobiol Aging*. 2006 Feb;27(2):228-36.
  52. Miklossy J, Kuntzer T, Bogousslavsky J, Regli F, Janzer RC. Meningovascular form of neuroborreliosis: Similarities between neuropathological findings in a case of Lyme disease and those occurring in tertiary neurosyphilis. *Acta Neuropathol* 1990;80. 568-572.
  53. Miklossy J, Taddei K, Martins R et al. Alzheimer disease: curly fibers and tangles in organs other than brain. *J Neuropathol Exp Neurol*. 1999;58, 803-814.
  54. Miklossy J, Van der Loos H. (1991) The long distance effects of brain lesions: A study of myelinated pathways in the human brain using polarizing and fluorescence microscopy. *J Neuropathol Exp Neurol* 50, 1-15.
  55. Miklossy J. (2012) Chronic or late lyme neuroborreliosis: analysis of evidence compared to chronic or late neurosyphilis. *Open Neurol J*. 6, 146-57.
  56. Miklossy J. Alzheimer's disease - a neurospirochetosis. Analysis of the evidence following Koch's and Hill's criteria. *J Neuroinflammation*. 2011 Aug 4;8(1):90.
  57. Miklossy J. Biology and neuropathology of dementia in syphilis and Lyme disease.

- Handb Clin Neurol. 2008;89:825-44.
58. Miklossy J. Chronic inflammation and amyloidogenesis in Alzheimer's disease -- role of spirochetes. *J Alzheimers Dis*. 2008 May;13(4):381-91.
  59. Miklossy J. Historic evidence to support a causal relationship between spirochetal infections and Alzheimer's disease. *Frontiers in Aging Neuroscience*. 2015 Apr 16;7:46.
  60. Miklossy J. Alzheimer's disease--a spirochetosis? *Neuroreport*. 1993 Jul;4(7):841-8.
  61. Miklossy J. The lack of correlation between the incidence of Lyme disease and deaths due to Alzheimer's disease cannot reflect the lack of involvement of *Borrelia burgdorferi* in Alzheimer's dementia. *J Alzheimers Dis* 2014;42:115-118.
  62. Nilsson P et al. A $\beta$  secretion and plaque formation depend on autophagy. *Cell Reports* 2013;5(1): 61-69.
  63. Almeida OP, Nicola T, Lautenschlager. Dementia associated with infectious diseases. *International Psychogeriatrics*. 2005; 17(Suppl): S65–S77.
  64. Pappolla MA, Omar R, Saran B, et al. Concurrent neuroborreliosis and Alzheimer's disease: analysis of the evidence. *Hum Pathol* 1989;20(8): 753-7.
  65. Riek R. Infectious Alzheimer's disease? *Nature* 2006;444: 429-431 .
  66. Ruitenbergh A, den Heijer T, Bakker SL, van Swieten JC, Koudstaal PJ, Hofman A, Breteler MM. Cerebral hypoperfusion and clinical onset of dementia: the Rotterdam study. *Ann Neurol*. 2005;57: 789-94.
  67. Selkoe DJ. Preventing Alzheimer's disease. *Science* 2012;337: 1488-92.
  68. Suter O-C, Sunthorn T, Kraftsik R, Straubel J, Darekar P, Khalili K, Miklossy J. Cerebral Hypoperfusion generates cortical watershed microinfarcts in Alzheimer disease. *Stroke* 2002;33: 1986-1992 .
  69. Verdile G, Gnjec A, Miklossy J, Fonte J, Veurink G, Bates K, Kakulas B, Mehta PD, Milward EA, Tan N, Lareu R, Lim D, Dharmarajan A, Martins RN. Protein markers for Alzheimer disease in the frontal cortex and cerebellum. *Neurology*. 2004 Oct 26;63(8):1385-92.
  70. Waniek C, Prohovnik I, Kaufman MA, Dwork AJ. Rapidly progressive frontal-type dementia associated with Lyme disease. *J Neuropsych Clin Neurosci*. 1995;7(3):345-7.
  71. Williams WM, Torres S, Siedlak SL, Castellani RJ, Perry G, Smith MA, Zhu X. Antimicrobial peptide beta-defensin-1 expression is upregulated in Alzheimer's brain. *J Neuroinflammation*. 2013;10(1): 127.
  72. Zajkowska JM, Hermanowska-Szapkowicz T. New aspects of the pathogenesis of Lyme disease. *Przegl Epidemiol* 2002;56 (Suppl 1):57-67.
  73. Zlokovic BV. Neurovascular pathways to neurodegeneration in Alzheimer's disease and other disorders. *Nat Rev Neurosci* 2011;12, 723-38.

### **Congenital/Sexual Transmission of Lyme/TBD**

1. Alekseev AN, Dubinina HV. Exchange of *Borrelia burgdorferi* between *Ixodes persulcatus* (Ixodidae: Acarina) sexual partners. *J Med Entomol*. 1996;33(3):351–354.
2. Carlomagno G, Luksa V, Candussi G, et al. Lyme *Borrelia* positive serology associated with spontaneous abortion in an endemic Italian area. *Acta Eur Fertil* 1988;19(5), 279-81.
3. Burgess EC, Amundson TE, Davis JP, et al.: Experimental inoculation of *Peromyscus* spp. with *Borrelia burgdorferi*: evidence of contact transmission. *Am J Trop Med Hyg*. 1986; 35(2): 355–9.
4. Gardner T. Lyme disease. In JS Remington and JO Klein (eds.), *Infectious Diseases of the Fetus and New Born Infant*. WB Saunders Co., Philadelphia, PA. 2001, pp. 519-641.

5. Harvey WT, Salvato P. 'Lyme disease': ancient engine of an unrecognized borreliosis pandemic? *Med Hypotheses*. 2003;60(5):742-59.
6. Hercogova J, Vanousova D. Syphilis and borreliosis during pregnancy. *Dermatol Ther* 2008;21(3), 205-9.
7. Jasik KP, Okla H, Słodki J, Rozwadowska B, Słodki A, Rupik W. Congenital tick-borne diseases: Is this an alternative route of transmission of tick-borne pathogens in mammals? *Vector Borne Zoonotic Dis*. 2015 Nov;15(11):637-44.
8. Kumi-Diaka J, Harris O. Viability of *Borrelia burgdorferi* in stored semen. *Br Vet J*. 1995 Mar-Apr;151(2):221-4.
9. Lakos A, Solymosi N. Maternal Lyme borreliosis and pregnancy outcome. *Int J Infect Dis* 2010;14(6): e494-8.
10. Lavoie PE, Lattner BP, Duray PH, Barbour AG, Johnson HC. Culture positive seronegative transplacental Lyme borreliosis infant mortality. *Arthritis Rheum*. 1987; 30 No 4, 3(Suppl):S50.
11. MacDonald AB. Gestational Lyme borreliosis. Implications for the fetus. *Rheum Dis Clin North Am*. 1989 Nov;15(4):657-77.
12. MacDonald AB. Human fetal borreliosis, toxemia of pregnancy, and fetal death. *Zentralbl Bakteriol Mikrobiol Hyg A*. 1986 Dec;263(1- 2):189-200.
13. MacDonald AB, Benach JL, Burgdorfer W. Stillbirth following maternal Lyme disease. *N Y State J Med*. 1987 Nov;87(11):615-6.
14. Markowitz LE, Steere AC, Benach JL, et al. Lyme disease during pregnancy. *JAMA*. 1986; 255(24): 3394-6.
15. Mikkelsen AL, Palle C. Lyme disease during pregnancy. *Acta Obstet Gynecol Scand* 1987;66(5): 477-8.
16. Mylonas I. Borreliosis during pregnancy: A risk for the unborn child? *Vector Borne Zoonotic Dis*. 2011;11:891-8.
17. Nadal D, Hunziker UA, Bucher HU, et al. Infants born to mothers with antibodies against *Borrelia burgdorferi* at delivery. *Eur J Pediatr* 1989;148(5): 426-7.
18. Onk G, Acun C, Kalayci M, Cagavi F, et al. Gestational Lyme disease as a rare cause of congenital hydrocephalus. *J Turkish German Gyn Assoc Artemis*. 2005; 6(2): 156-157.
19. Schlesinger PA, Duray PH, Burke BA, Steere AC, Stillman MT. Maternal-fetal transmission of the Lyme disease spirochete, *Borrelia burgdorferi*. *Ann Intern Med*. 1985;103: 67-8.
20. Schutzer SE, Janniger CK, Schwartz RA. Lyme disease during pregnancy. *Cutis* 1991;47(4): 267-8.
21. Silver H. Lyme disease during pregnancy. *Infect Dis Clin North Am*. 1997;11(1):93–97.
22. Stricker RB, Middelveen MJ. Sexual transmission of Lyme disease: challenging the tickborne disease paradigm. *Expert Rev Anti-Infect Ther*. 2015;13:1303–1306.
23. Stricker RB, Moore DH, Winger EE. Clinical and immunologic evidence of transmission of Lyme disease through intimate human contact. *J Invest Med*. 2004;52: S15
24. Strobino BA, Williams CL, Abid S, et al. Lyme disease and pregnancy outcome: a prospective study of two thousand prenatal patients. *Am J Obstet Gynecol*. 1993; 169(2 Pt 1): 367-74.
25. van Holten J, Tiems J, Jongen VH. Neonatal *Borrelia duttoni* infection: a report of three cases. *Trop Doct* 1997;27(2): 115-6.
26. Weber K; Bratzke HJ, Neubert U, Wilske B, Duray PH. *Borrelia burgdorferi* in a newborn despite oral penicillin for Lyme borreliosis during pregnancy. *Pediatr Infect Dis J*. 1988; 7:286-9.
27. Williams CL, Strobino B, Weinstein A, et al. Maternal Lyme disease and congenital malformations: a cord blood serosurvey in endemic and control areas. *Paediatr Perinat Epidemiol* 1995;9(3): 320-30.

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