

## Angiopathie, Vaskulitis

**Diseases and findings by changes in the vessels** <https://en.wikipedia.org/wiki/Angiopathy>

**Erkrankungen und Befunde durch Veränderungen der Gefäße** <http://de.wikipedia.org/wiki/Angiopathie>

bei Arteriolen und Kapillaren als **Mikroangiopathie** <http://de.wikipedia.org/wiki/Mikroangiopathie>

bei großen Gefäßen als **Makroangiopathie**, <http://de.wikipedia.org/wiki/Arteriosklerose>,

bei Venen, als **Venopathie** <http://de.wikipedia.org/wiki/Vene>

bei Lymphgefäßen, als **Lymphangiopathie** <http://de.wikipedia.org/wiki/Lymphgef%C3%A4%C3%9F>.

**Mikroangiopathie** <http://de.wikipedia.org/wiki/Mikroangiopathie>

1. Primary systemic vasculitis

z. B. **c and p-ANCA-associated vasculitis** z. B. Wegener's granulomatosis. Polyangiitis. Churg-Strauss. Cold antibody disease. Henoch-Schönlein Purpura. Cutaneous polyarteritis nodosa.

2. Secondary systemic vasculitis

eg., **rheumatoid arthritis, dermatomyositis. Sarcoidosis. Infection with EBV, CMV, HSV, Cocksackie virus, HTLV-1, HCV, HBV, chlamydia, mycoplasma, Borrelia**, the causative agent of leprosy. MOTs, porphyromonas gingivalis. Systemic lupus erythematosus. Sjögren's syndrome. Systemic sclerosis. Behcet's disease. **Malignant tumors**. Inflammatory bowel disease. Vasculitis with urticaria by Complement deficiency states, drugs.

3. Non-systemic or local vasculitis

z. B. **diabetic angiopathy** as diabetic retinopathy, diabetic than glomerulo sclerosis, diabetic neuropathic and as peripheral diabetic angiopathy with ulcers and gangrene in the legs

1. Primäre systemische Vaskulitiden

z. B. **c- und p-ANCA assoziierte Vaskulitiden** z. B. Wegenersche Granulomatose. Polyangiitis. Churg-Strauss. Kälteantikörper Krankheit. Purpura Schönlein-Henoch. Kutane Polyarteriitis nodosa.

2. Sekundäre systemische Vaskulitiden

z. B. **Rheumatoide Arthritis, Dermatomyositis. Sarkoidose. Infektionen mit EBV, CMV, HSV, Cocksackie Virus, HTLV-1, HCV, HBV, Chlamydien, Mykoplasmen, Borrelien**, dem Erreger der Lepra. MOTs, porphyromonas gingivalis. Systemischer Lupus erythematosus. Sjögrens Syndrom. Systemische Sklerose. Morbus BehCet. **Bösartige Tumore**. Entzündliche Darmerkrankungen. Vaskulitis mit Urtikaria durch Complement-Mangelzustände, Drogen.

3. Nichtsystemisch oder lokale Vaskulitiden

z. B. **diabetischen Angiopathie** als diabetische Retinopathie, als diabetische Glomerulo-Sklerose, als diabetische Neuropathie und als periphere diabetische Angiopathie mit Ulcera und Gangrän an den Beinen.

In Anlehnung an Quelle, source: [www.thelancet.com/neurology](http://www.thelancet.com/neurology) Vol 13 January 2014

The blood vessel texture is locally very different durable. It has been formed from the surrounding tissue in the embryonic period. Die Blutadertextur ist lokal sehr unterschiedlich strapazierfähig. Sie bildete sich in der Embryonalzeit aus dem sie umgebenden Gewebe.

## **Immunosystem**

Wenzel K (1996), Choi AJS (2011), Moore KJ (2011), Libby P (2012), Towfique R (2013), Ramesh G (2023), Parthasarathy G (2013), Soloski MJ (2014), Back M (2015), Nichols L (2008), Aiello AE (2017), Tuñón J (2018)

## **Viruses**

Khang JH (2009)

## **Bacteria**

Huismans BD (1969), Uldry PA (1987), Veenendaal-Hilbers, JA (1988), Meier C (1988), May EF (1990), Meurers B (1990), May EF (1990), Brogan GX (1990), Hammers-Berggren S (1993), Reik L Jr (1993), Delpla PA (1993), Defer G (1993), Henriksen TB (1997), Oksi J (1998), Cook PJ (1998), Wilke M (2000), Canver CC (2000), Zhang Y (2000), Prager M (2002), Heinrich A (2003), Romi F (2004), Schmiedel J (2004), Leonardi S (2005), Topakian R (2007), Topakian R (2008), Rudenko N (2008), Topakian R (2008), Fallon B.A (2009), Scheu JJ (2009), Adamaszek M (2010), Rai NK (2011), Hinterseher I (2012), Back T (2013), Renko J (2013), Ebady R (2016)

Scholz W (1938) **Studien zur Pathologie der Hirngefäße. II Die drusige Entartung der Hirnarterien und Kapillaren.** Z Neurol Psychiatr. 162, 694–715

Rankine J (1957) **Cerebral vascular accidents in patients over the age of 60.** Scott Med J 2, 200–215

Uldry PA, Regli, F, et al, (1987) **Cerebral angiopathy and recurrent strokes following Borrelia burgdorferi infection.** J. Neurol. Neurosurg. Psychiatry 50 (12), 1703-1704.

Veenendaal-Hilbers, JA, Perquin, WV, et al. (1988) Basal meningovascularitis and occlusion of the basilar artery in two cases of Borrelia burgdorferi infection. Neurologists 38 (8), 1317-1319.

Meier C, Grehl H, (1988) Vasculitic neuropathy in the Garin-Bujadoux-Bannwarth syndrome. A contribution to the understanding of the pathology and pathogenesis of the neurological complications in Lyme borreliosis. Dtsch. Med. Wochenschr. 113 (4), 135-138.

Brott T, Adams HP Jr, Olinger CP, Marler JR, Barsan WG, Biller J, Spilker J, Holleran R, Eberle R, Hertzberg V et al (1989) Measurements of acute cerebral infarction: a clinical examination scale. Stroke 20, 864–870

May EF, Jabbari B, (1990). Stroke in neuroborreliosis. Stroke 21 (8), 1232-1235.

Kolominsky-Rabas PL, Sarti C, Heuschmann PU, Graf C, Siemonsen S, Neundoerfer B, Katalinic A, Lang E, Gassmann KG, von Stockert TR (1998) A prospective community-based study of stroke in Germany—the Erlangen Stroke Project (ESPro): incidence and case fatality at 1, 3, and 12 months. Stroke 29, 2501–2506

Oksi J, Kalimo H, Marttila R (1998) Intracranial aneurysms in three patients with disseminated Lyme borreliosis: cause or chance association? J Neurol Neurosurg Psychiatry. 64(5), 636–642. PMID: PMC2170070 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2170070/>

Huppertz HI, Bohme M, Standaert SM, Karch H, Plotkin SA (1999) Incidence of Lyme borreliosis in the Wurzburg region of Germany. Eur J Clin Microbiol Infect Dis 18, 697–703

Moore PM (2000) Vasculitis of the central nervous system. Curr Rheumatol Rep 2, 376–382

Wilke M, Eiffert H, et al. (2000) Primarily chronic and cerebrovascular course of Lyme neuroborreliosis: case reports and literature review. Arch. Dis. Child. 83 (1), 67-71.

Heinrich A, Khaw A et al. (2003) Cerebral vasculitis as the only manifestation of Borrelia burgdorferi infection in a 17-year-old Patient with basal ganglia infarction. Eur. Neurol. 50 (2), 109-112.

- Romi F, Krakenes J, Aarli JA, Tysnes OB (2004) Neuroborreliosis with vasculitis causing stroke-like manifestations. *Eur Neurol* 51, 49–50
- Schmiedel J, Gahn G, et al. (2004) Cerebral vasculitis with multiple infarcts caused by Lyme disease. *Cerebrovasc. Dis.* 17 (1), 79-81
- Topakian R, Stieglbauer K, et al. (2007) Unexplained cerebral vasculitis and stroke: keep Lyme neuroborreliosis in mind. *Lancet Neurol.* 6 (9), 756-757.
- Kuker W, Gaertner S, Nagele T, Dopfer C, Schoning M, Fiehler J, Rothwell PM, Herrlinger U (2008) Vessel wall contrast enhancement: a diagnostic sign of cerebral vasculitis. *Cerebrovasc Dis* 26, 23–29
- Topakian R, Stieglbauer K, Nussbaumer K, Aichner FT (2008) Cerebral vasculitis and stroke in Lyme neuroborreliosis. Two case reports and review of current knowledge. *Cerebrovasc Dis* 26, 455–461  
<http://dx.doi.org/10.1159/000155982>
- Rudenko N, Golovchenko M, Aleš Mokráček A et al. (2008) Detection of *Borrelia bissettii* in Cardiac Valve Tissue of a Patient with Endocarditis and Aortic Valve Stenosis in the Czech Republic ▽ *J Clin Microbiol.* 46(10), 3540–3543. doi: [10.1128/JCM.01032-08](https://doi.org/10.1128/JCM.01032-08) PMID: PMC2566110  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566110/>
- Smith EE, Greenberg SM (2009) Beta-amyloid, blood vessels, and brain function. *Stroke.* 40(7), 2601–2606. [PMID 19443808](https://pubmed.ncbi.nlm.nih.gov/19443808/)
- Hahn H, Kaufmann SHE, Schulz TF, Suerbaum S (Hrsg.) (2009) *Medizinische Mikrobiologie und Infektiologie.* 6. Aufl., Springer Verlag, Heidelberg [ISBN 978-3-540-46359-7](https://www.isbn-international.org/product/978-3-540-46359-7), 416–426.
- Adamaszek M, Heinrich A, Rang A, Langner S, Khaw AV (2010) Cerebral sinuvenous thrombosis associated with Lyme neuroborreliosis. *J Neurol* 257, 481–483
- Meyer B, Ringel F, Winter Y, Spottke A, Gharevi N, Dams J, Balzer-Geldsetzer M, Mueller IK, Klockgether T, Schramm J, Urbach H, Dodel R (2010) Health-related quality of life in patients with subarachnoid haemorrhage. *Cerebrovasc Dis* 30, 423–431
- Moore KJ, Tabas I (2011) Macrophages in the pathogenesis of atherosclerosis. *Cell* 145, 341–355.  
[Google Scholar](https://scholar.google.com/scholar?hl=en&as_scp=1&as_sml=1&as_ssp=1), [Crossref](https://pubmed.ncbi.nlm.nih.gov/21481411/), [Medline](https://pubmed.ncbi.nlm.nih.gov/21481411/), [ISI](https://pubmed.ncbi.nlm.nih.gov/21481411/)
- Libby P (2012) Inflammation in Atherosclerosis. *Arterioscler Thromb Vasc Biol* 32 2045–2051. [Google Scholar](https://pubmed.ncbi.nlm.nih.gov/22411411/), [Crossref](https://pubmed.ncbi.nlm.nih.gov/22411411/), [Medline](https://pubmed.ncbi.nlm.nih.gov/22411411/), [ISI](https://pubmed.ncbi.nlm.nih.gov/22411411/)
- Back T, Grünig S, Winter Y et al. (2013) Neuroborreliosis-associated cerebral vasculitis: long-term outcome and health-related quality of life. *J Neurol.* 260(6), 1569-75. doi: 10.1007/s00415-013-6831-4. Epub 2013 Jan 18. [https://www.ncbi.nlm.nih.gov/pubmed/23329377](https://pubmed.ncbi.nlm.nih.gov/23329377/)
- Gwathmey KG, Burns TM, Collins MP, P Dyck JB (2014) Vasculitic Neuropathies. Review.  
[www.thelancet.com/neurology Vol 13 January 2014](http://www.thelancet.com/neurology/Vol13/January2014)  
**“Vasculitis affecting the peripheral nerves is commonly seen in patients with primary systemic vasculitis and can also result from vasculitis secondary to connective tissue diseases, viral infections, or malignancies. Not uncommonly (30% of reported cases), vasculitis is confined to the nerves and possibly also the adjacent muscles, an entity termed NSVN. DLRPN, LRPN, DCRPN, and painless diabetic motor neuropathy are emerging as additional non-systemic vasculitic neuropathies with predominant micro vasculitic involvement. Neurologists should have the ability to diagnose, classify, and appropriately treat vasculitic neuropathy... See: Panel 1: Classification of vasculitides associated with neuropathy”.**
- Bremell D, Dotevall L (2014) **Oral doxycycline for Lyme neuroborreliosis with symptoms of encephalitis, myelitis, vasculitis or intracranial hypertension.** *European Journal of Neurology.* [21\(9\)](https://pubmed.ncbi.nlm.nih.gov/24911411/), 1162–1167
- Back M, Hansson GK (2015) Anti-inflammatory therapies for atherosclerosis. *Nat Rev Cardiol* 12, 199–211. [Google Scholar](https://pubmed.ncbi.nlm.nih.gov/25911411/), [Crossref](https://pubmed.ncbi.nlm.nih.gov/25911411/), [Medline](https://pubmed.ncbi.nlm.nih.gov/25911411/)

Ebady R, Niddam AF, Boczula AE et al. (2016) **Biomechanics of Borrelia burgdorferi Vascular Interactions**. Cell Reports DOI: <http://dx.doi.org/10.1016/j.celrep.2016.08.013>  
[http://www.cell.com/cell-reports/pdfExtended/S2211-1247\(16\)31059-2](http://www.cell.com/cell-reports/pdfExtended/S2211-1247(16)31059-2)

Haverich A, Kreipe H (2016) **Ursachenforschung Arteriosklerose. Warum wir die KHK nicht verstehen**. Deutsches Ärzteblatt 113,10, C358-C361  
<http://www.aerzteblatt.de/archiv/175264/Ursachenforschung-Arteriosklerose-Warum-wir-die-KHK-nicht-verstehen>

Block F, Dafotakis M (2017) **Zerebrale Amyloidangiopathie in der Schlaganfallmedizin**. Dt. Ärzteblatt 114(3), 37-424

Tuñón J, Bäck M, Badimón L (2018) ESC Working Group on Atherosclerosis and Vascular Biology: Interplay between hypercholesterolaemia and inflammation in atherosclerosis: Translating experimental targets into clinical practice; European Journal of Preventive Cardiology; DOI: [10.1177/2047487318773384](https://doi.org/10.1177/2047487318773384) PDF

➔ **Chlamydia pneumoniae** [http://www.kabilahsystems.de/chlamydia\\_pneumoniae.pdf](http://www.kabilahsystems.de/chlamydia_pneumoniae.pdf)

**Makroangiopathie** <http://de.wikipedia.org/wiki/Arteriosklerose>

e. g. Giant cell arteritis. Atherosclerosis, arterial occlusive disease (AOD) (stroke, myocardial infarction, intermittent claudication (peripheral arterial disease (PVK)), aortic aneurysm).

z. B. Riesenzell Arteriitis. Arteriosklerose, Arterielle Verschlusskrankheit (AVK) (Schlaganfall, Herzinfarkt, Schaufenster Krankheit (periphere arterielle Verschlusskrankheit (PVK)), Aortenaneurysma).

Virchow R. (1847) **Über die akute Entzündung der Arterien**. Archiv für pathologische Anatomie und Physiologie und für Klinische Medizin. Heft 2  
[http://books.google.com.au/books?id=n\\_kEAAAQAAJ&printsec=frontcover&hl=de&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com.au/books?id=n_kEAAAQAAJ&printsec=frontcover&hl=de&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false) <http://link.springer.com/article/10.1007%2FBF01975873#page-1>

Rokitansky C v. (1852) **Über einige der wichtigsten Erkrankungen der Arterien**. Vorgetragen in der Sitzung der mathematisch-naturwissenschaftlichen Classe der kaiserlichen Akademie der Wissenschaften am 26. Juni 1851. K.-K. Hof- und Staatsdruck S. 3 ff.  
A manual of pathological anatomy. 4, Day G E, Sydenham Society, London

Virchow, R. (1856) **Phlogose und Thrombose im Gefäßsystem**. In: Virchow, Gesammelte Abhandlungen zur Wissenschaftlichen Medicin, S.458-564 Meidinger Sohn, Berlin, Frankfurt am Main

Köster (1875) **Die Entstehung der spontanen Aneurysmen und die chronische Mesarteriitis**. Berliner Klinische Wochenschrift

Rindfleisch E (1878) **Lehrbuch der pathologischen Gewebelehre**. II. Aufl.; S. 181, 184, 185.

Boinet E, Romary D (1897) **Recherches experimentales sur les aortites**. Arch Med Exp 9, 902.

Marchand F (1904) **Ueber Arteriosklerose**. Verhandl D Kongr F inn Med Leipzig.

Scarpa A (1908) **Über die Pulsadergeschwülste**. Zürich, Bei Orell, Füssli und Compagnie.  
[https://books.google.de/books?id=wbjHDSnt6tIC&pg=PA349&pg=PA349&dq=arterientextur&source=bl&ots=f62r0R-KaM&sig=kucz2WJMqKY-2bAYguqxcxN7JpU&hl=de&sa=X&ved=0ahUKEwi6huzp-7\\_LAhWGd5oKHfz6DcUQ6AEIKTAB#v=onepage&q=arterientextur&f=false](https://books.google.de/books?id=wbjHDSnt6tIC&pg=PA349&pg=PA349&dq=arterientextur&source=bl&ots=f62r0R-KaM&sig=kucz2WJMqKY-2bAYguqxcxN7JpU&hl=de&sa=X&ved=0ahUKEwi6huzp-7_LAhWGd5oKHfz6DcUQ6AEIKTAB#v=onepage&q=arterientextur&f=false)

Faber A (1912) **Die Arteriosklerose**. Jena: Gustav Fischer Verlag S. 51.

Huismans BD (1969) **Der Aortenbogensatz bei luischen Aneurysmen**. Inaugural-Dissertation der Medizinischen Fakultät der Universität zu Köln.

- Ross R, Glomset JA (1973) **Atherosclerosis** and the arterial smooth muscle cell. *Science* 180, 1332-1339
- Ross R, Raines EW, Bowen-Pope DF (1986) The biology of platelet-derived growth factor. *Cell* 46, 155-169
- May EF, Jabbari B (1990) **Stroke in neuroborreliosis**. *Stroke* 21, 1232–1235
- Meurers B, Kohlhepp W, Gold R, Rohrbach E, Mertens HG (1990) Histopathological findings in the central and peripheral nervous systems in **neuroborreliosis**. A report of three cases. *J Neurol* 237, 113–116
- Brogan GX Homan CS Viccellio P (1990) THE ENLARGING CLINICAL SPECTRUM OF LYME DISEASE: LYME CEREBRAL VASCULITIS, A NEW DISEASE ENTITY. [SEE COMMENTS] *Ann Emerg Med* 19(5), 572-6 <http://www.ncbi.nlm.nih.gov/pubmed/2331105>
- Hammers-Berggren S, Grondahl A, Karlsson M, von Arbin M, Carlsson A, Stiernstedt G (1993) Screening for neuroborreliosis in patients with **stroke**. *Stroke*. 24(9), 1393-6 <http://www.ncbi.nlm.nih.gov/pubmed/8362437>
- Reik L Jr (1993) **Stroke** due to Lyme disease. *Neurology* 43(12), 2705-7 <http://www.ncbi.nlm.nih.gov/pubmed/8255484>
- Delpa PA, Delisle MB, Arne-Bes MC, Archambaud M, Geraud G, Bes A (1993) MULTIPLE MONONEURITIS AND CEREBRAL MENINGO-ARTERITIS. WEGENER DISEASE OR LYME DISEASE? *Rev Neurol (Paris)* 149(6-7), 411-5 <http://www.ncbi.nlm.nih.gov/pubmed/8303161>
- Defer G, Levy R, Brugieres P, Postic D, Degos JD (1993) LYME DISEASE PRESENTING AS A STROKE IN THE VERTEBROBASILAR TERRITORY: MRI. *Neuroradiology* 35(7), 529-31 <http://www.ncbi.nlm.nih.gov/pubmed/8232882>
- Ross R (1993) The pathogenesis of atherosclerosis: a perspective for the 1990s. *Nature* 362, 801-809
- Watts RA, Scott DGI (1995) ABC of Rheumatology: RASHES AND VASCULITIS. *BMJ* 310, 1128 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2549507/>
- Wenzel K, Ernst M, Rohde K, Baumann G, Speer A (1996) DNA polymorphisms in adhesion molecule genes - a new risk factor for early atherosclerosis. *Human Genetics* 97, 15-20
- Gasser R, Fruhwald F, Schumacher et al. (1996) REVERSAL OF BORRELIA BURGDOERFERI ASSOCIATED DILATED CARDIOMYOPATHY BY ANTIBIOTIC TREATMENT? *Cardiovasc Drugs Ther* 10(3), 351-60 <http://www.ncbi.nlm.nih.gov/pubmed/8877079>
- Henriksen TB (1997) [LYME NEURO-BORRELIOSIS IN A 66-YEAR OLD WOMEN. DIFFERENTIAL DIAGNOSIS OF CEREBRAL METASTASES AND CEREBRAL INFARCTION] *Ugeskr Laeger* 159(21), 3175-7 <http://www.ncbi.nlm.nih.gov/pubmed/9199007>
- Oksi J, Kalimo H, Marttila RJ et al. (1998) Intracranial aneurysms in three patients with disseminated Lyme borreliosis: cause or chance association? *J Neurol Neurosurg Psychiatry* 64, 636-642 <http://jnnp.bmj.com/content/64/5/636.abstract>
- Cook PJ, Honeybourne D, Lip GY et al. (1998) Chlamydia pneumonia antibody titers are significantly associated with acute stroke and transient cerebral ischemia: the West Birmingham Stroke Project. *Stroke; a journal of cerebral circulation*. 29 (45), 404-10
- Moore PM (2000) Vasculitis of the central nervous system. *Curr Rheumatol Rep* 2, 376–382
- [Canver CC](#), [Chanda J](#), [DeBellis DM](#), [Kelley JM](#) (2000) Possible relationship between degenerative cardiac valvular pathology and lyme disease. *Ann Thorac Surg*. 70(1), 283-5. <http://www.ncbi.nlm.nih.gov/pubmed/10921726>

Zhang Y, Lafontant G, Bonner FJ Jr. (2000) Lyme neuroborreliosis mimics stroke: a case report. Arch Phys Med Rehabil 81(4), 519-21 <http://www.ncbi.nlm.nih.gov/pubmed/10768546>

Prager M, Türel Z, Speidl WS et al (2002) Chlamydia pneumonia in carotid artery atherosclerosis: a comparison of its presence in atherosclerotic plaque, healthy vessels, and circulating leucocytes from the same individuals. Stroke; a journal of cerebral circulation 33(12), 2756-61

Romi F, Krakenes J, Aarli JA, Tysnes OB (2004) Neuroborreliosis with vasculitis causing stroke-like manifestations. Eur Neurol 51, 49–50

Schmiedel J, Gahn G, von Kummer R, Reichmann H (2004) **Cerebral vasculitis** with multiple infarcts caused by lyme disease. Cerebrovasc Dis 17, 79–81

Walter MA, Melzer RA, Graf M, Tyndall A, Müller-Brand J, Nitzsche EU (2005). [\[18F\]FDG-PET of giant-cell aortitis](#). Rheumatology (Oxford). 44 (5), 690–1. doi:10.1093/rheumatology/keh551. PMID 15728420.

Leonardi S, Pavone P, Rotolo N et al. (2005) Stroke in two children with Mycoplasma pneumonia infection. A causal relationship?. The Pediatric infectious disease journal. 24 (9), 843-5

Miklossy J, Kasas S, Zurn AD, et al. (2008) Persisting atypical and cystic forms of Borrelia burgdorferi and local inflammation in Lyme neuroborreliosis. J Neuroinflammation 40. [Abstract](#)

Kuker W, Gaertner S, Nagele T et al. (2008) Vessel wall contrast enhancement: a diagnostic sign of cerebral vasculitis. Cerebrovasc Dis 26, 23–29

[Nichols L](#), [Lagana S](#), [Parwani A](#) (2008) Coronary artery aneurysm: a review and hypothesis regarding etiology. Arch Pathol Lab Med. 132(5), 823-8. doi: 10.1043/1543-2165(2008)132[823:CAAARA]2.0.CO;2. <https://www.ncbi.nlm.nih.gov/pubmed/18466032>  
**„Increased proteolysis of extracellular matrix proteins is probably one mechanism of coronary artery aneurysm formation, either due to overactive matrix metalloproteinases or underactive inhibition of these proteinases, and an excess of transforming growth factor beta may be another mechanism in the pathogenesis.“**

Fallon BA et al. (2009) Inflammation and central nervous system Lyme disease, Neurobiol. Dis., doi:10.1016/j.nbd.2009.11.016

Scheu JJ, Chiou HY, Kang JH et al (2009) Tuberculosis and the Risk of Ischemic Stroke: A 3-Year Follow-Up Study. Stroke 41 (2), 244-9

Khang JH, Ho JD, Chen YH et al. (2009) Increased Risk of Stroke after a Herpes Zoster Attack: A Population-Based Follow-Up Study. Stroke 40 (11), 3443-8

Adamaszek M, Heinrich A, Rang A, Langner S, Khaw AV (2010) Cerebral sinuvenous thrombosis associated with Lyme neuroborreliosis. J Neurol 257, 481–483

Rai NK, Choudhary R, Bhatia R et al. (2011) Chlamydia pneumoniae seropositivity in adults with acute ischemic stroke: A case-control study. Ann Indian Acad Neurol 14, 93-7. <http://www.annalsofian.org/text.asp?2011/14/2/93/82792>

Irwin MR (2011) Inflammation at the intersection of behavior and somatic symptoms. Psychiatr Clin North Am 34(3), 605-20. [Full Citation](#)

Choi AJS, Ryter SW (2011) Review Article Autophagy in Inflammatory Diseases. International Journal of Cell Biology Volume 2011, Article ID 732798, 11 pages doi:10.1155/2011/732798 <http://www.hindawi.com/journals/ijcb/2011/732798/>

[Hinterseher I](#), [Gäbel G](#), [Corvinus F](#), [Lück C](#), [Saeger HD](#), [Bergert H](#), [Tromp G](#), [Kuivaniemi H](#). (2012) **Presence of Borrelia burgdorferi sensu lato antibodies in the serum of patients with abdominal**

**aortic aneurysms.** Eur J Clin Microbiol Infect Dis. 31(5), 781-9. doi: 10.1007/s10096-011-1375-y. Epub 2011 Aug 13. <http://www.ncbi.nlm.nih.gov/pubmed/21842293>

**“Our findings suggest a relationship between AAAs and *B. burgdorferi* sl. We hypothesize that the underlying mechanism for *B. burgdorferi* sl in AAA formation is similar to that by the spirochete *Treponema pallidum*; alternatively, AAAs could develop due to induced autoimmunity via molecular mimicry due to similarities between some of the *B. burgdorferi* sl proteins and aortic proteins.”**

[Renko J](#), [Koskela KA](#), [Lepp PW](#), et al. (2013) Bacterial DNA signatures in carotid atherosclerosis represent both commensals and pathogens of skin origin. Eur J Dermatol. 23(1), 53-8. doi: 10.1684/ejd.2012.1908. <http://www.ncbi.nlm.nih.gov/pubmed/23406581>

**“The most prominent phylum, Actinobacteria, accounted for 74% of these relevant sequences. Furthermore, according to the Human Microbiome project database, interestingly, nearly all (94%) of the sequences were associated with the human skin microbiome.”**

Towfique Raj, Manik Kuchroo, Joseph M. Replogle, Soumya Raychaudhuri, Barbara E. Stranger, Philip L. De Jager. (2013) Common Risk Alleles for Inflammatory Diseases Are Targets of Recent Positive Selection. The American Journal of Human Genetics, DOI: [10.1016/j.ajhg.2013.03.001](https://doi.org/10.1016/j.ajhg.2013.03.001)

Back T, Grünig S, Winter Y, Bodechtel U, Guthke K, Khati D, von Kummer R. (2013) Neuroborreliosis-associated cerebral vasculitis: long-term outcome and health-related quality of life. J Neurol. 260(6), 1569-75. <http://www.ncbi.nlm.nih.gov/pubmed/23329377>

[Raison CL](#), [Miller AH](#) (2013) Malaise, melancholia and madness: The evolutionary legacy of an inflammatory bias. Brain, Behavior, and Immunity. Available online.

[http://scienceindex.com/stories/3071388/Malaise\\_Melancholia\\_and\\_Madness\\_The\\_Evolutionary\\_Legacy\\_of\\_an\\_Inflammatory\\_Bias.html](http://scienceindex.com/stories/3071388/Malaise_Melancholia_and_Madness_The_Evolutionary_Legacy_of_an_Inflammatory_Bias.html)

[Ramesh G](#), [Maclean AG](#), [Philipp MT](#). (2013) Cytokines and Chemokines at the Crossroads of Neuroinflammation, Neurodegeneration, and Neuropathic Pain. Mediators Inflamm. 480739. Epub. <http://www.ncbi.nlm.nih.gov/pubmed/23997430>

[Parthasarathy G](#), [Philipp MT](#). (2013) Non-viable *Borrelia burgdorferi* induce inflammatory mediators and apoptosis in human oligodendrocytes. *Neurosci Lett*. 556:200-3. doi: 10.1016/j.neulet.2013.10.032. Epub 2013 Oct 22. <http://www.ncbi.nlm.nih.gov/pubmed/24157855>  
<http://www.bioportfolio.com/resources/pmarticle/712797/Non-viable-Borrelia-burgdorferi-induce-inflammatory-mediators-and-apoptosis-in-human-oligodendrocytes.html>

Stone NJ, Robinson J, Lichtenstein AH, et al. (2013) 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic risk in adults: A report of the American College of Cardiology/American Heart Association. J Am Coll Cardiol 2013 Article, Circulation 2013 Article. [http://www.medscape.com/viewarticle/814152\\_print](http://www.medscape.com/viewarticle/814152_print)  
<https://circ.ahajournals.org/content/early/2013/11/11/101.cir.0000437738.63853.7a.full.pdf+html>

Kester MI, et al. (2014) Associations Between Cerebral Small-Vessel Disease and Alzheimer Disease Pathology as Measured by Cerebrospinal Fluid Biomarkers. JAMA Neurol., DOI: [10.1001/jamaneurol.2014.754](https://doi.org/10.1001/jamaneurol.2014.754)

[Soloski MJ](#), [Crowder LA](#), [Lahey LJ](#) et al. (2014) Serum inflammatory mediators as markers of human Lyme disease activity. *PLoS One*. 9(4), e93243. doi: 10.1371/journal.pone.0093243. eCollection 2014. <http://www.ncbi.nlm.nih.gov/pubmed/24740099>

Gilden D, White T, Khmeleva, N et al. (2015) [Prevalence and distribution of VZV in temporal arteries of patients with giant cell arteritis](#). Neurology. 84 (19), 1948–1955. doi:10.1212/WNL.0000000000001409. ISSN 0028-3878. PMC 4433460. PMID 25695965. <http://www.neurology.org/content/84/19/1948>

**“Most GCA-positive TAs contained VZV [Varicella-zoster virus] in skip areas that correlated with adjacent GCA pathology, supporting the hypothesis that VZV triggers GCA immunopathology. Antiviral treatment may confer additional benefit to patients with GCA treated with corticosteroids, although the optimal antiviral regimen remains to be determined.”**

[Aiello AE](#), [Jayabalasingham B](#), [Simanek AM](#) et al. (2017) **The impact of pathogen burden on leukocyte telomere length in the Multi-Ethnic Study of Atherosclerosis.** [Epidemiol Infect.](#) 145(14), 3076-3084. doi: 10.1017/S0950268817001881. Epub 2017 Sep 7.  
<https://www.ncbi.nlm.nih.gov/pubmed/28879822>

[Garkowski A](#), [Zajkowska J](#), [Zajkowska A](#) et al. (2017) **Cerebrovascular Manifestations of Lyme Neuroborreliosis—A Systematic Review of Published Cases.** [Front Neurol.](#) 8, 146.  
doi:[10.3389/fneur.2017.00146](https://doi.org/10.3389/fneur.2017.00146) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5397664/>  
« **Cerebral vasculitis and stroke due to LNB should be considered, especially in patients who live in or have come from areas with high prevalence of tick-borne diseases, as well as in those without cardiovascular risk factors, but with stroke-like symptoms of unknown cause.** »

- ➔ **Herzkrankheit** <http://www.xerlebnishaft.de/herzkrankheit.pdf>
- ➔ **Bakterienpleomorphie, L-Formen und Horizontaler Gentransfer**  
<http://www.erlebnishaft.de/stressvar1.pdf> <http://www.erlebnishaft.de/stressvar2.pdf>

**Venen**, Venopathie <http://de.wikipedia.org/wiki/Vene>

e. g. Hemorrhoids bleeding, varicose veins. Venous thrombosis.

z. B. Hämorrhoidenbluten, Krampfaderleiden. Venöse Thrombosen.

Lauer M, Stolze K, Hatz H, Helmke K, Löffler W (1990) **Granulomatous thrombophlebitis in Lyme borreliosis-case report.** *Immun Infekt* 18, 57–8. <https://europepmc.org/abstract/med/2351413>

Cameron DJ, Johnson LB, Maloney EL (2014) Evidence assessments and guideline recommendations in Lyme disease: the clinical management of known tick bites, erythema migrans rashes and persistent disease. *Expert Rev Anti Infect Ther.* 12(9), 1103–1135. [[PMC free article](#)] [[PubMed](#)]

- ➔ **Antikoagulation** <http://www.kabilahsystems.de/hyperkoagulation.pdf>

**Lymphgefäße** <http://de.wikipedia.org/wiki/Lymphgef%C3%A4%C3%9F>

e. g. Lymphangiopathie, edema, elephantiasis.

z. B. Lymphangiopathie, Ödeme, Elephantiasis.

[Louveau A](#), [Smirnov I](#), [Keyes TJ](#) et al. (2015) **Structural and functional features of central nervous system lymphatic vessels.** *Nature* 523, 337–341 doi:10.1038/nature14432  
<http://www.nature.com/nature/journal/v523/n7560/full/nature14432.html>

## Entzündungshemmstoffe, inflammation inhibitors

- ➔ **H2, V-ATPase, intakter O2- und Zuckerstoffwechsel** <http://www.kabilahsystems.de/ph.pdf>
- ➔ **Antibiotika** <http://www.kabilahsystems.de/antibiosetherapieplan.pdf>
- ➔ **Biogene Amine und Peptide** <http://www.kabilahsystems.de/biogeneamineundpeptide.pdf>
- ➔ **Fettsäuren** <http://www.kabilahsystems.de/ungesaettfets.pdf>
- ➔ **Polyphenole** <http://www.kabilahsystems.de/polyphenole.pdf>
- ➔ **Vitamin D3, Vitamin E, Vitamin B12, B-Vitamine ...** <http://www.xerlebnishaft.de/vitamine.pdf>



- **Mitochondrien** [http://www.kabilahsystems.de/q10\\_und\\_l.pdf](http://www.kabilahsystems.de/q10_und_l.pdf)
- **Zytoskelett** <http://www.xerlebnishaft.de/zytoskelett.pdf>
  
- **Borreliose und Ko-Infektionen, Lymphom, Neoplasma**  
[http://www.xerlebnishaft.de/borrel\\_inflam\\_lymphom\\_neopl.pdf](http://www.xerlebnishaft.de/borrel_inflam_lymphom_neopl.pdf)

[Bernt - Dieter Huismans](#), Letzte Revision August 2018 [www.Huismans.click](http://www.Huismans.click)  
Back to top: <http://www.xerlebnishaft.de/angiopathie.pdf>

