

## PRAXISRELEVANTE Zytokine, Chemokine Cytokins and chemokins relevant to practice

Laboratory marker **(grün, green)** „silent inflammation“, cold infection, infection chaud

	IFN-g	TNF-a	IL-1	ATP	Hista- min	IL-6	MDA- LDL	Nitro- tyrosin
<b>Fatigue / Depression</b> <u>Zytoskelett</u>								
<u>Mitochondrial dysfunction</u>								
Insulinresistenz & Adipositas / Kataboler Knochenstoffwechsel z.B. Parodontitis, Osteoporose								
<b>Arterioskleritis /</b> <u>Angiopathie</u>								

Müller KE (2013) **Silent Inflammation. Bedeutung bei chronischen Multisystemerkrankungen.**  
[http://www.inflammatio.de/fileadmin/user\\_upload/inflammatio/Online\\_Fortbildungen/Vortraege\\_2013/2013\\_10\\_30\\_Silent\\_Inflammation.pdf](http://www.inflammatio.de/fileadmin/user_upload/inflammatio/Online_Fortbildungen/Vortraege_2013/2013_10_30_Silent_Inflammation.pdf)

v. Behr V (2015) **Silent Inflammation nicht sichtbar aber spürbar.**  
[http://www.inflammatio.de/fileadmin/user\\_upload/inflammatio/Online\\_Fortbildungen/2015/2015\\_01\\_28\\_Silent\\_Inflammation\\_nicht\\_sichtbar\\_aber\\_spuerbar.pdf](http://www.inflammatio.de/fileadmin/user_upload/inflammatio/Online_Fortbildungen/2015/2015_01_28_Silent_Inflammation_nicht_sichtbar_aber_spuerbar.pdf)

### Methoden der Entzündungshemmung, Methods of inhibition of inflammation:

1. **Elimination des Entzündungsreizes Elimination of the inflammatory stimulus**  
(leaky gut, Herdgeschehen, chronisch aktivierte Infektion, Mitochondrien Dysfunktion)
  2. **Hemmung der, inhibition of NFkappa B in Makrophagen, macrophages** (Kortikoide, sehr niedrig dosiert, corticoids low dosed, Vitamin D3, Boswellia)
  3. **Modulation der Toll like Rezeptoren** (Resveratrol, Curcumin, S-Adenylmethionin, Vitamin D3, SAM, evtl. Statine)
- ➔ **Pflanzliche Antimikrobiotika und antientzündlich wirkende Substanzen,**  
➔ **Herbal Antimicrobials and anti-inflammation-inducing substances:**  
<http://www.kabilahsystems.de/pflanzlicheantimikrobiotika.pdf>  
<http://www.kabilahsystems.de/pfefferchilligelbwurz.pdf>  
<http://www.kabilahsystems.de/paupereia.pdf> <http://www.xerlebnishaft.de/kraeutertherapie.pdf>  
Prednisolon, Boscari (afrikanischer Weihrauch), Boswellia (indischer Weihrauch), Cefatec 480 (Teufelskralle), Cilantis (Koriander), Coenzym Q10, L-Carnitin, Methyl-Sulfonyl-Methan, Quercetin, Resveratrol, Samento (Katzenkrallen), Silymarin (Mariendistel), S-Adenosylmethionin.
- ➔ **NO/ONOO** Pall ML (2015) Wie heilt man Erkrankungen mit Beteiligung des NO/ONOO – Zyklus?  
<http://www.martinpall.info/wp-content/uploads/2010/04/Martin-Pall-Wie-heilt-man.pdf>
- ➔ **Immunsuppression nur bei Entzündungs - Katastrophen,**  
➔ **immunosuppression when inflammatory - disasters occur only**  
<http://www.xerlebnishaft.de/immunsuppression.pdf>

Auron PE, Webb AC, Rosenwasser LJ et al. (1984) Nucleotide sequence of human monocyte interleukin 1 precursor cDNA. [PNAS](#), Band 81 (24), 7907–7911, [Zusammenfassung](#)

Jones SA et al. (1999) [C-reactive Protein: A Physiological Activator of Interleukin-6 Receptor Shedding](#). [J Exp Med](#) 189, 599-604.

Niwa Y, Akamatsu H, Niwa H, Sumi H, Ozaki Y, Abe A. (2001) Correlation of tissue and plasma **RANTES levels** with disease course in patients with breast or cervical cancer. *Clin Cancer Res.* 7(2), 285–9. <http://www.ncbi.nlm.nih.gov/pubmed/11234881>

Dinarello ChA (2002) A complex of the IL-1 homologue IL-1F7b and IL-18-binding protein reduces IL-18 activity. *Journal: Proc Natl Acad Sci U S A.* 99(21), 13723-8

Heinrich PC et al. (2003) [Principles of Interleukin \(IL\)-6-type signalling and its regulation](#). [Biochem J](#) 374, 1-20.

Dinarello ChA (2004) Differences in signaling pathways by IL-1beta and IL-18. *Journal: Proc Natl Acad Sci U S A;* 101(23), 8815-20

Dinarello ChA (2005) Interleukin-32: a cytokine and inducer of TNFalpha. *Journ. Immu.* 22(1), 131-42

Dinarello ChA (2005) IL-32 synergizes with nucleotide oligomerization domain (NOD) 1 and NOD2 ligands for IL-1beta and IL-6 production through a caspase 1-dependent mechanism. *Journal: Proc Natl Acad Sci U S A.* 102(45), 16309-14

Dinarello ChA (2006) Alveolar type II cells inhibit fibroblast proliferation: role of IL-1alpha. *Journal: Am J Physiol Lung Cell Mol Physiol;* 290(2), L307-16

Dinarello ChA(2006) IL-32, a proinflammatory cytokine in rheumatoid arthritis. *Journal: Proc Natl Acad Sci U S A.* 103(9), 3298-303

Raison CL, Capuron L, Miller AH. (2006) **Cytokines sing the blues:** inflammation and the pathogenesis of depression. *Trends Immunol.* 27, 24–31. An excellent review of the clinical features of cytokine-induced depression and its possible mechanisms. [[PMC free article](#)] [[PubMed](#)]

Shoelson SE, Lee J, Goldfine AB. (2006) **Inflammation and insulin resistance.** *Journal of Clinical Investigation.* 116(7), 1793–1801. [[PMC free article](#)] [[PubMed](#)]

[Rysz J](#), [Banach M](#), [Cialkowska-Rysz A](#) et al. (2006) **Blood serum levels of IL-2, IL-6, IL-8, TNF-alpha and IL-1beta in patients on maintenance hemodialysis.** [Cell Mol Immunol.](#) 3(2), 151-4. <http://www.ncbi.nlm.nih.gov/pubmed/16696903>

[Castellani ML](#), [Bhattacharya K](#), [Tagen M](#) et al. (2007) **Anti-chemokine therapy for inflammatory diseases.** [Int J Immunopathol Pharmacol.](#) 20(3), 447-53. <http://www.ncbi.nlm.nih.gov/pubmed/17880758>

[Dantzer R](#), O'Connor JC, Freund GG et al. (2008) Review. **From inflammation to sickness and depression: when the immune system subjugates the brain.** *Nature Reviews Neuroscience* 9(1), 46-56. <http://www.ncbi.nlm.nih.gov/pubmed/18073775> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2919277/>  
**«However, this traditional view of the relationship between inflammation and morbidity/mortality in physically ill patients is challenged by the new hypothesis, set out in this Review, that depression can actually be caused by inflammation in vulnerable patients»**

Gemeinsamer Bundesausschuss (GBA) (2009) **Arzneimittel-Richtlinie/ Anlage VI (Interleukin-2 in der systemischen Anwendung beim metastasierten malignen Melanom)**  
<https://www.g-ba.de/informationen/beschluesse/1050/>

## Anti-Zytokine, anti-cytokins, Anti-Chemokine, anti-chemokins

### 1. ANTIOXYDANTIEN

N-Acetylcystein  
Alphaliponsäure

Gosset P, et al. Eur Respir J. (1999) 14, 98-105  
Suzuki YJ, et al. Bioch.Bioph.Res.Com.1992;189:1709-15

### 2. ERNÄHRUNGS - ZUSATZSTOFFE

Joghurt  
Omega 3 Fettsäuren  
Fischöl

[HA CL, et al. J.Food Prot 1999; 62:181-8](#)  
Venkatraman JT, Chu WC. J Am Coll Nutr 1999;18:602-13  
James MJ, et al. AmJ.Clin. Nutr 2000;71(1Suppl.):343-8

### 3. NICHTSTEROIDALE ANTIRHEUM.

Acetylsalicylsäure  
Ibuprofen  
Diclofenac

Yin Z et al. <https://www.ncbi.nlm.nih.gov/pubmed/24631121>  
Shi X, et al. Mol Cell Bioch.1999;199:93-102  
[Stuhlmeier KM, et al.Biochem Pharmacol 199 1;57:313-20](#)  
[Henrotin YE, et al. Clin Exp Rheumatol 1999;17:151-60](#)

### 4. ANTIBIOTIKA

Clarithromycin  
Roxithromycin

[Matsuoka N, et al. Clin Exp Immunol 1996;104:501-8](#)  
[Nonaka M, et al. Acta Otolaryngol Suppl 1998; 539:71-5](#)

Doxycyclin  
Minocyclin

<http://www.journals.uchicago.edu/doi/abs/10.1086/597807>  
<http://www.journals.uchicago.edu/doi/abs/10.1086/597807>

### 5. ANDERE ARZNEIMITTEL

ACE - Hemmer  
Olmesartan

Gullestad L et al. J Am Coll Cardio 1999;34:2061-7  
[D.Filser et al. Circulation 2004; 110; 1103-1107](#)

Calciumantagonisten

Rodler S. et al. J Mol Cell Cardiol 1995;27:2295-302

HMG-CoA-Hemmer ( [CSE-Hemmer](#) )

Ortego M et al. J Arteriosclerosis 1999;147:253-61

Vitamin C

Vitamin B12

Vlahopoulos S, et.al. Blood 1999;94:1878-89  
[Buccellato FR et al. FASEB J 1999;13:297-304](#)

Vitamin D ( in physiologischen Mengen ! )

Pentoxiphyllin

Harant H et al. Eur J Bioch. 1997 15;250:63-71

Inosine

Neuner P et al.Immunology 1994;83:262-7

Progesteron ( in physiologischen Mengen ! )

Hasko G, et al. J Immunol 2000;164:1013-9

Vassiliadou N et al. J Immunol 1999;15;162:7510-8

Östrogene ( in physiologischen Mengen ! )

Inandera H et al. Endocrinology 2000;141:50-9

L-Thyroxin ( in physiologischen Mengen ! )

Ritterhouse PA et al. Endocrinology 1997;138:1434-9

Cheno- , Ursosäuren

[Saitoh\\_O.et.al.Gastro.Hepatol.1998;13: 1212-17](#)

Laevodopa

Bessler H et al. Biomed Pharmacother 1999;53:141-5

Furosemid

Yengsirgul A et al.Ann Aller. Asthma Immu.1999;83:559-66

Morphine

Grimm C. et al. Ann N Y Acad Sci 1998 1;840:9-20

Pioglitazon

Cartwright M.,T.S.Donta Meet.o.the Am.Soc.o.Biolog.1999

[Tumornekrosef.-Alp.-Ak.\(Adalimumab\)](#)

[Periscope-Studie 2008 Proactive-Studie 2007](#)

Rau R., Arzneimitteltherapie 2004 7:203

### 6. PFLANZENEXTRAKTE

Quinine (Chinin)

Maruyama N, et al. AmJ RespirCell Mol Biol 1994;10:514-20

Quercetin (Eichenrindenextrakt)

Ishikawa Y, et al. J Am Soc Nephrol 1999;10:2290-6

Ginkgo biloba

[Wei Z et al. Gen Pharmakol 1999;33:369-75](#)

Silymarin (Mariendistel)

[Saliou C et al. FEBS Lett 1998 27;440:8-12](#)

Boswelia

<http://www.kabilahsystems.de/pflanzlicheantimikrobiotika.pdf>

[Licastro F](#), Chiappelli M, Ianni M, Porcellini E (2009) **Tumor necrosis factor-alpha antagonists: differential clinical effects by different biotechnical molecules.** *Int J Immunopathol Pharmacol*, 22(3), 67-72. <http://www.ncbi.nlm.nih.gov/pubmed/19822073>

Chakrabarty P, Jansen-West K, Beccard A et al. (2010) **Massive gliosis induced by interleukin-6 suppresses A deposition in vivo: evidence against inflammation as a driving force for amyloid deposition.** *FASEB J*. 24, 548–559 doi:10.1096/fj.09-141754 PMID 19825975.

[Sears B](#), [Ricordi C](#) (2011) **Anti-Inflammatory Nutrition as a Pharmacological Approach to Treat Obesity.** *J Obes*. 2011, 431985. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2952901/>

[Ridker PM](#), [Thuren T](#), [Zalewski A](#), [Libby P](#) (2011) **Interleukin-1 $\beta$  inhibition and the prevention of recurrent cardiovascular events: rationale and design of the Canakinumab Anti-inflammatory Thrombosis Outcomes Study (CANTOS).** *Am Heart J*. 162(4), 597-605. doi: 10.1016/j.ahj.2011.06.012. Epub 2011 Sep 14. <http://www.ncbi.nlm.nih.gov/pubmed/21982649> <http://www.cvgk.nl/d/381/cantos-studie-remming-van-interleukine-bij-atherotrombose>

[Hansen ES](#), [Medić V](#), [Kuo J](#) et al. (2013) **Interleukin-10 (IL-10) inhibits Borrelia burgdorferi-induced IL-17 production and attenuates IL-17-mediated Lyme arthritis.** *Infect Immun*. 81(12), 4421-30. doi: 10.1128/IAI.01129-13. Epub 2013 Sep 16. <http://www.ncbi.nlm.nih.gov/pubmed/24042116> <http://iai.asm.org/content/81/12/4421.full> <http://iai.asm.org/content/early/2013/09/10/IAI.01129-13.full.pdf>

[Yin Z](#), [Wang Y](#), [Whittell LR](#), [Jergic S](#) et al. (2014) **DNA replication is the target for the antibacterial effects of nonsteroidal anti-inflammatory drugs.** *Chem Biol*. 21(4), 481-7. doi: 10.1016/j.chembiol.2014.02.009. Epub 2014 Mar 13. <https://www.ncbi.nlm.nih.gov/pubmed/24631121>

[Lukewich MK](#), [Rogers RC](#), [Lomax AE](#) (2014) **Divergent neuroendocrine responses to localized and systemic inflammation.** *Seminars in immunology*. pii: S1044-5323(14)00005-0. doi: 10.1016/j.smim.2014.01.004. <http://www.ncbi.nlm.nih.gov/pubmed/24486057> <http://dx.doi.org/10.1016/j.smim.2014.01.004>

[Yanguas-Casás N](#), [Barreda-Manso MA](#), [Nieto-Sampedro M](#), [Romero-Ramírez L](#) (2014) **Tauroursodeoxycholic acid reduces glial cell activation in an animal model of acute neuroinflammation.** *Journal of Neuroinflammation* 11, 50 <http://www.jneuroinflammation.com/content/11/1/50>

[Padro CJ](#), [Sanders VM](#) (2014) **Neuroendocrine regulation of inflammation.** *Seminars in immunology*. <http://www.sciencedirect.com/science/article/pii/S1044532314000049>

[Köhler O](#), [Benros ME](#), [Nordentoft M](#) et al. (2014) **Effect of Anti-inflammatory Treatment on Depression, Depressive Symptoms, and Adverse Effects.** A Systematic Review and Meta-analysis of Randomized Clinical Trials. *JAMA Psychiatry*. doi:10.1001/jamapsychiatry.2014.1611 <http://archpsyc.jamanetwork.com/article.aspx?articleid=1916904>

[Schoffelen T](#), [Wegdam-Blans MC](#), [Ammerdorffer A](#) (2015) **Specific in vitro interferon-gamma and IL-2 production as biomarkers during treatment of chronic Q fever.** *Front Microbiol*. 6, 93. doi: 10.3389/fmicb.2015.00093. eCollection 2015. <http://www.ncbi.nlm.nih.gov/pubmed/25729380> **«We propose that the IFN- $\gamma$ /IL-2 ratio can be used as an additional biomarker for monitoring chronic Q fever treatment, with declining ratios being indicative of successful treatment. «**

[Hornig M](#), [Montoya JG](#), [Klimas N](#) et al. (2015) **Distinct plasma immune signatures in ME/CFS are present early in the course of illness.** *Science Advances* 1(1), e1400121 <http://advances.sciencemag.org/content/1/1/e1400121>

[Hornig M, Gottschalk G, Peterson DL](#) et al (2015) **Cytokine network analysis of cerebrospinal fluid in myalgic encephalomyelitis/chronic fatigue syndrome.** *Mol Psychiatry.* doi: 10.1038/mp.2015.29. [Epub ahead of print] <http://www.ncbi.nlm.nih.gov/pubmed/25824300>

Cunningham C, Hennessy E (2015) **Co-morbidity and systemic inflammation as drivers of cognitive decline: new experimental models adopting a broader paradigm in dementia research.** *Alzheimer's Research & Therapy* 7,33 DOI 10.1186/s13195-015-0117-2 <http://www.ncbi.nlm.nih.gov/pubmed/25802557> <http://alzres.com/content/7/1/33>

Lechner J, von Baehr V (2015) **Chemokine RANTES/CCL5** as an unknown link between wound healing in the jawbone and systemic disease: is prediction and tailored treatments in the horizon? *The EPMA Journal* 6, 10 DOI 10.1186/s13167-015-0032-4 <http://www.epmajournal.com/content/6/1/10>

Oosting M, Kerstholt M, ter Horst R et al. (2016) **Functional and Genomic Architecture of Borrelia burgdorferi-Induced Cytokine Responses in Humans.** *Cell Host & Microbe*, DOI: [10.1016/j.chom.2016.10.006](https://doi.org/10.1016/j.chom.2016.10.006)

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[Luo Y, He H, Zhang M, Huang X, Fan N](#) (2016) **Altered serum levels of TNF- $\alpha$ , IL-6 and IL-18 in manic, depressive, mixed state of bipolar disorder patients.** *Psychiatry Res.* 244, 19-23. doi: 10.1016/j.psychres.2016.07.027. Epub 2016 Jul 18. <https://www.ncbi.nlm.nih.gov/pubmed/27455146>

[Fan N, Luo Y, Ou Y, He H](#) (2017) **Altered serum levels of TNF- $\alpha$ , IL-6, and IL-18 in depressive disorder patients.** *Hum Psychopharmacol.* doi: 10.1002/hup.2588. [Epub ahead of print] <https://www.ncbi.nlm.nih.gov/pubmed/28582802>

Hamilton (2017) **Neuroinflammation: The Brain is on Fire in a Cytokine Storm.** <https://www.researchednutritional.com/wp-content/uploads/2017/02/Neuroinflammation-The-brain-on-fire-newsletter-2-14-17-002.pdf>  
<https://www.researchednutritional.com>

- ➔ **[Darm - Schutz](#)** [http://www.xerlebnishaft.de/gastroent\\_borr.pdf](http://www.xerlebnishaft.de/gastroent_borr.pdf)  
Probiotika, probiotics <http://www.kabilahsystems.de/probiotika.pdf>
- ➔ **[Anti - Entzündung, Anti - Koagulation](#)**
- ➔ <http://www.erlebnishaft.de/arthritis.pdf> <http://www.xerlebnishaft.de/angiopathie.pdf>  
<http://www.erlebnishaft.de/kommentalternativ.pdf>  
Fettsäuren, fatty acids <http://www.kabilahsystems.de/ungesaettfetts.pdf>  
Polyphenole, polyphenoles <http://www.kabilahsystems.de/polyphenole.pdf>  
Antikoagulation, anticoagulants <http://www.kabilahsystems.de/hyperkoagulation.pdf>
- ➔ **[Immun - Stimulation](#)**
- ➔ <http://www.erlebnishaft.de/symbiogenese.pdf>  
Immunstimulantien, immunostimulants <http://www.kabilahsystems.de/immunsti.pdf>
- ➔ **[Biofilm - Lyse](#)**
- ➔ <http://www.erlebnishaft.de/kommentbiofilmmed.pdf>  
Quorum <http://www.xerlebnishaft.de/quorum.pdf>
- ➔ **[Erschöpfungs - Linderung, Mitochondrien - Schutz](#)**  
Vitamin B Komplex + Folsäure, folic acid <http://www.xerlebnishaft.de/bildmethyl-arginin.pdf>  
Q10 + L-Carnitin [http://www.kabilahsystems.de/q10\\_und\\_l.pdf](http://www.kabilahsystems.de/q10_und_l.pdf)
- ➔ **[Schmerz - Linderung](#)**  
Schmerztherapeutika, pain therapeutics <http://www.kabilahsystems.de/schmerz.pdf>
- ➔ **[Mitochondrien, mitochondria](#)** <http://www.xerlebnishaft.de/mitochondrien.pdf>

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- **Zytoskelett, zytoskeleton** <http://www.xerlebnishaft.de/zytoskelett.pdf>
- **Zellwand, cell wall** <http://www.kabilahsystems.de/ungesaettfets.pdf>
  
- **Pleomorphie, bacterial pleomorphy** <http://www.erlebnishaft.de/stressvar1.pdf>  
<http://www.erlebnishaft.de/stressvar2.pdf>
- **Biofilme, biofilms** <http://www.erlebnishaft.de/kommentbiofilmmed.pdf>
  
- **Größenvergleich Lebensformen, size comparison of life forms**  
<http://www.xerlebnishaft.de/lebensstrukturenvergleich.pdf>
  
- **Angiopathie, angiopathy** <http://www.xerlebnishaft.de/angiopathie.pdf>
- **Krebsstammzelltherapie, cancer stem cell therapy**  
<http://www.xerlebnishaft.de/krebsstammzelltherapie.pdf>
  
- **Cavete Diagnosen, cavete diagnoses** <http://www.erlebnishaft.de/kommentalternativ.pdf>

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