

## TLR2, TLR1, TLR7, TLR13

**Toll-ähnlicher Rezeptoren, TLR, toll-like receptors** sind die **Pattern Recognition Receptors**, die **PRRs** der innate immunity, die Mustererkennungssysteme des angeborenen Immunsystems.

Toll-like receptors, TLR are the Pattern Recognition Receptors, PRRs of innate immunity, the pattern recognition systems of the innate immune system.

Steinhagen F, Kinjo Takeshi, Bode Christian, Klinman DM (2011) **TLR-Based Immune Adjuvants**. *Vaccine*. 29(17), 3341-3355 <http://www.ncbi.nlm.nih.gov/pubmed/20713100>  
<http://www.sciencedirect.com/science/article/pii/S0264410X10011114>

„Der **Toll-like-Rezeptor 2 (TLR-2)** ist ein Membranprotein, des angeborenen Immunsystems. Der Rezeptor sitzt auf der Oberfläche von Leukozyten und Zellen von Lunge und Leber. Er erkennt körperfremde Stoffe, insbesondere Bestandteile der Zellwand von Bakterien und leitet entsprechende Signale an die Zelle weiter. Mutationen im **TLR-2-Gen** des Menschen können Anfälligkeit für Lepra- oder Tuberkulose-Infektionen hervorrufen.“ Quelle: <http://de.wikipedia.org/wiki/TLR-2>

Hirschfeld M, Kirschning CJ, Schwandner R, et al. (1999) Cutting edge: inflammatory signaling by **Borrelia burgdorferi** lipoproteins is mediated by **toll-like receptor 2**. *J Immunol* 163(5), 2382-6. [Abstract](#)

Bulut Y, Faure E, Thomas L, et al. (2001) Cooperation of Toll-like receptor 2 and 6 for cellular activation by soluble tuberculosis factor and **Borrelia burgdorferi** outer surface protein A lipoprotein: role of Toll-interacting protein and IL-1 receptor signaling molecules in **Toll-like receptor 2** signaling. *J Immunol* 167(2), 987-94. [Abstract](#)

Wooten RM, Ma Y, Yoder RA, et al. (2002) **Toll-like receptor 2** plays a pivotal role in host defense and inflammatory response to **Borrelia burgdorferi**. *Vector Borne Zoonotic Dis* 2(4), 275-8. [Full Citation](#)

Kawai T, Akira S. (2005) Pathogen recognition with Toll-like receptors. *Curr Opin Immunol*. 17, 338-44. [Medline](#)

Marcińczyk M, Jabłońska E, Puzewska W, et al. (2005) Effect of rhIL-15 on **TLR2** expression and apoptosis of PMN from patients with **Lyme disease**. *Med Dosw Mikrobiol*; 57(1), 85-91. [Abstract](#)

Cassiani-Ingoni R, Cabral ES, Lünemann JD, et al. (2006) **Borrelia burgdorferi** Induces **TLR1 and TLR2** in human microglia and peripheral blood monocytes but differentially regulates HLA-class II expression. *J Neuropathol Exp Neurol* 65(6), 540-8. [Abstract](#)

Singh SK, Girschick HJ (2006) Toll-like receptors in **Borrelia burgdorferi**-induced inflammation. *Clin Mikrobiol Infect* 12, 705-717 <http://www.ncbi.nlm.nih.gov/pubmed/16842565>

Honda K, Taniguchi T. (2006) IRFs: master regulators of signaling by Toll-like receptors and cytosolic pattern-recognition receptors. *Nat. Rev. Immunol.* 6, 644–658. [CrossRefMedline](#)

Rupprecht TA, Kirschning CJ, Popp B, et al. (2007) **Borrelia garinii** induces CXCL13 production in human monocytes through **Toll-like receptor 2**. *Infect Immun* 75(9), 4351-6. [Abstract](#)

Bernardino AL, Myers TA, et al. (2008). Toll-like receptors: insights in-to their possible role in the pathogenesis of **Lyme neuroborreliosis**. *Infect. Immun.*76 (10), 4385-4395

Salazar JC, Duhnam-Ems S, La Vake C, Cruz AR, Moore MW, Caimano MJ, et al. (2009) Activation of human monocytes by live **Borrelia burgdorferi** generates **TLR2**-dependent and -independent responses which include induction of IFN-beta. *PLoS pathogens*. 5(5), e1000444.

Iliopoulou BP, Huber BT (2010) Infectious arthritis and immune dysregulation: lessons from **Lyme disease**. *Curr Opin Rheumatol* 22(4), 451-5. [Abstract](#)

Blasius AL, Beutler B (2010) **Intracellular Toll-like receptors**. *Immunity* 32, 305–315. [CrossRefMedline](#)

Cervantes JL, et al. (2011) Phagosomal signaling by *Borrelia burgdorferi* in human monocytes involves Toll-like receptor **(TLR) 2 and TLR8** cooperativity and TLR8-mediated induction of IFN-beta. *Proc Natl Acad Sci USA* 108(9), 3683–3688.

Oosting M, Ter Hofstede H, Sturm P, et al. (2011) **TLR1/TLR2** heterodimers play an important role in the recognition of **Borrelia** spirochetes. *PLoS One* 6(10), e25998. [Abstract](#)

Shi C, Sahay B, Russell JQ, et al. (2011) Reduced immune response to **Borrelia** burgdorferi in the absence of  $\gamma\delta$  T cells. *Infect Immun* 79(10), 3940-6. [Abstract](#)

Barbro H. Skogman, Sandra Hellberg,3 Christina Ekerfelt, et al. (2012) Adaptive and Innate Immune Responsiveness to **Borrelia** burgdorferi sensu lato in Exposed Asymptomatic Children and Children with Previous Clinical Lyme Borreliosis. *Clinical and Developmental Immunology* Volume 2012, Article ID 294587, 10 pages doi:10.1155/2012/294587 <http://www.hindawi.com/journals/cdi/2012/294587/>

[Tschirren B](#), [Andersson M](#), [Scherman K](#), [Westerdahl H](#), [Mittl PRE](#); [Raberg L](#) (2013). Polymorphisms at the innate immune receptor **TLR2** are associated with **borrelia** infection in a wild rodent population. *Proceedings of the Royal Society of London, Series B: Biological Sciences*:Epub ahead of print. <http://www.zora.uzh.ch/76641/> <http://www.ncbi.nlm.nih.gov/pubmed/19275590>

Oosting M, Buffen K, van der Meer JMM (2014) **Innate immunity networks during infection with Borrelia burgdorferi**. *Crit Rev Microbiol*, Early Online: 1–12 <http://www.ncbi.nlm.nih.gov/pubmed/24963691>

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“**TLR1** recognises [peptidoglycan](#) and (triacyl) [lipoproteins](#) in concert with [TLR2](#) (as a heterodimer). It is found on the surface of [macrophages](#) and [neutrophils](#)“. Quelle: [http://en.wikipedia.org/wiki/TLR\\_1](http://en.wikipedia.org/wiki/TLR_1)

Takeuchi O, Sato S, Horiuchi T, Hoshino K, Takeda K, Dong Z, et al. (2002) Cutting edge: **role of toll-like receptor 1** in mediating immune response to microbial lipoproteins. *Journal of immunology*. 169(1), 10-4.

Skogman BH, Hellberg S, Ekerfelt C. et al. (2012) Adaptive and Innate Immune Responsiveness to **Borrelia burgdorferi** sensu lato in Exposed Asymptomatic Children and Children with Previous Clinical Lyme Borreliosis. *Clinical and Developmental Immunology*. Volume 2012, Article ID 294587, 10 pages doi:10.1155/2012/294587 <http://www.hindawi.com/journals/cdi/2012/294587/>

**TLR3, CD283** ([cluster of differentiation](#) 283) is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. Quelle: [http://en.wikipedia.org/wiki/TLR\\_3](http://en.wikipedia.org/wiki/TLR_3)

Cavassani KA, Ishii M, Wen H, Schaller MA, Lincoln PM, Lukacs N, et-al. (2008) TLR3 is an endogenous sensor of tissue necrosis during acute inflammatory events. *J Exp Med*. 205, 2609-21. [Medline](#)

Lee, K. G. et al. (2012) Bruton's tyrosine kinase phosphorylates Toll-like receptor 3 to initiate antiviral response. Proceedings of the National Academy of Sciences 109, 5791–5796

“**TLR7** is a member of the [Toll-like receptor](#) (TLR) family which plays a fundamental role in pathogen recognition and activation of [innate immunity](#)“. Quelle: [http://en.wikipedia.org/wiki/TLR\\_7](http://en.wikipedia.org/wiki/TLR_7)

Christensen SR, Shupe J, Nickerson K, Kashgarian M, Flavell RA, Shlomchik MJ. (2006) **Toll-like receptor 7 and TLR9** dictate autoantibody specificity and have opposing inflammatory and regulatory roles in a murine model of lupus. Immunity. 25, 417-28. [Medline](#)

Petzke MM, Brooks A, Krupna MA, Mordue D, Schwartz I. (2009) Recognition of *Borrelia burgdorferi*, the Lyme disease spirochete, by **TLR7 and TLR9** induces a type I IFN response by human immune cells. Journal of immunology. 183(8), 5279-92.

Browne EP (2011) **Toll-like Receptor 7** Controls the Anti-Retroviral Germinal Center Response. PLoS Pathogens 7(10) <http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.1002293>

“**TLR13** Toll-like receptor 1 bis 13 [http://en.wikipedia.org/wiki/Toll-like\\_receptor](http://en.wikipedia.org/wiki/Toll-like_receptor)”

Shi Z, Cai Z, Sanchez A, et al. (2011). A novel Toll-like receptor that recognizes **vesicular stomatitis virus**. 286. pp. 4517–24.

Oldenburg M, Krüger A, Ferstl R et al. (2012) **TLR13 Recognizes Bacterial 23S rRNA Devoid of Erythromycin Resistance-Forming Modification**. Science, DOI: [10.1126/science.1220363](https://doi.org/10.1126/science.1220363)

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