

Chemotaxis und Bewegung bei Spirochäten Chemotaxis and movement in spirochetes

Weibull C, Tiselius A (1945) Note on the acid hydrolysis of bacterial flagella. *Ark.Kemi Min. Geol.* 20B, no. 3

Stocker BAD, Campbell JC, (1959) The Effect of Non-Lethal Deflagellation on Bacterial Motility and Observations on Flagellar Regeneration. *J. gen. Microbiol.* 20, 670-685

Asakura S (1970) Polymerization of flagellin and polymorphism of flagella. *Adv. Biophys.* 1, 99-155.

Greenberg EP, Canale-Parola E (1977) Chemotaxis in *Spirochaeta aurantia*. *J Bacteriol* 130, 485-94.

Greenberg EP, Canale-Parola E (1977) Relationship between cell coiling and motility of spirochetes in viscous environments. *J. Bacteriol.* 131, 960-969.

Goulbourne Jr EA, Greenberg EP (1980) Relationship between proton motive force and motility in *Spirochaeta aurantia*. *J. Bacteriol.* 143, 1450-1457.

Goulbourne Jr EA, Greenberg EP (1981) Chemotaxis of *Spirochaeta aurantia*: involvement of membrane potential in chemosensory signal transduction. *J. Bacteriol.* 148, 837-844.

Goulbourne Jr EA, Greenberg EP (1983) A voltage clamp inhibits chemotaxis of *Spirochaeta aurantia*. *J. Bacteriol.* 153, 916-920.

Fosnaugh K, Greenberg EP (1989) Chemotaxis mutants of *Spirochaeta aurantia*. *J. Bacteriol.* 171, 606-611.

Goldstein SF, Charon NW (1990) Multiple-exposure photographic analysis of a motile spirochete. *Proc. Natl. Acad. Sci. USA* 87, 4895-4899.

Kudo S, Magariyama Y, Aizawa S-I (1990) Abrupt changes in flagellar rotation observed by laser dark-field microscopy. *Nature* 346, 677-680.

Charon NW, Goldstein SF, Block SM, Curci K, Ruby JD, Kreiling JA, Limberger RJ (1992) Morphology and dynamics of protruding spirochete periplasmic flagella. *J. Bacteriol.* 174, 832-840.

Charon NW, Greenberg EP, Koopman MB, Limberger RJ (1992) Spirochete chemotaxis, motility, and the structure of the spirochetal periplasmic flagella. *Res. Microbiol.* 143, 597-603.

Goldstein SF, Charon NW, Kreiling JA (1994) *Borrelia burgdorferi* swims with a planar waveform similar to that of eukaryotic flagella. *Proc. Natl. Acad. Sci. USA* 91, 3433-3437.

Magariyama Y, Sugiyama S, Muramoto K, Kawagishi I, Imae Y, Seishi K (1995) Simultaneous measurement of bacterial flagellar rotation rate and swimming speed. *Biophys. J.* 69, 2151-2162.

Goldstein SF, Buttle KF, Charon NW (1996) Structural analysis of the Leptospiraceae and *Borrelia burgdorferi* by highvoltage electron microscopy. *J. Bacteriol.* 178, 6539-6545.

Guo BP, Brown EL, Dorward DW et al. (1998) Decorin-Binding Adhesins from *Borrelia burgdorferi*. *Molecular Microbiology*, **30**, 711-723. <http://dx.doi.org/10.1046/j.1365-2958.1998.01103.x>

Ge Yigoing Li C, Corum L, Slaughter CA, Charon NW (1998) Structure and expression of the FlaA periplasmic flagellar protein of *Borrelia burgdorferi*. *J. Bacteriol.* 180, 2418-2425.

Parveen N, Leong JM (1998) Identification of a Candidate Glycosaminoglycan-Binding Adhesin of the Lyme Disease Spirochete *Borrelia burgdorferi*. *Molecular Microbiology*, **35**, 1220-1234. <http://dx.doi.org/10.1046/j.1365-2958.2000.01792.x>

- Probert WS, Johnson BJ (1998) Identification of a 47 kDa Fibrinonection-Binding Protein Expressed by *Borrelia burgdorferi* Isolate B31. *Molecular Microbiology*, **30**, 1003-1015.
<http://dx.doi.org/10.1046/j.1365-2958.1998.01127.x>
- Li C, Corum L, Morgan D, Rosey EL, Stanton TB, Charon NW (2000) The spirochete FlaA periplasmic flagellar sheath protein impacts flagellar helicity. *J. Bacteriol.* 182, 6698–6706.
- Motaleb MA, Corum L, Bono J et al. (2000): *Borrelia burgdorferi* periplasmic flagella have both skeletal and motility functions. *Proc. Natl. Acad. Sci. USA* 97, 10899–10904.
- Charon NW, Goldstein SF (2002) Genetics of motility and chemotaxis of a fascinating group of bacteria: The Spirochetes. *Ann. Rev. Genet.* 36, 47–73.
- Li C, Bakker RG, Motaleb MA, Sartakova ML, Cabello FC, Charon NW (2002) Asymmetrical flagellar rotation in *Borrelia burgdorferi* nonchemotactic mutants. *Proc. Natl. Acad. Sci. USA* 99, 6169–6174.
- Magariyama Y, Sugiyama S, Kudo S (2001) Bacterial swimming speed and rotation rate of bundled flagella. *FEMS Microbiol. Lett.* 199, 125–129.
- Minamino T, Namba K (2004) Self-assembly and type III protein export of the bacterial flagellum. *J. Mol. Microbiol. Biotechnol.* 7, 5–17.
- Wolgemuth CW, Charon NW, Goldstein SF, Goldstein RE (2006) The flagellar cytoskeleton of the spirochetes. *J. Mol. Microbiol. Biotechnol.* 11, 221–227
- Wada H, Netz RR (2007) Model for self-propulsive helical filaments: kink-pair propagation. *Phys. Rev. Lett.* 99, 108102.
- Minamino T, Imada K, Namba K (2008) Mechanisms of type III protein export for bacterial flagellar assembly. *Mol. Biosyst.* 4, 1105–1115.
- Sowa Y, Berry RM (2008) Bacterial flagellar motor. *Q. Rev. Biophys.* 41, 103–132.
- Dombrowski C, Kan W, Motaleb A, Charon NW, Goldstein RE, Wolgemuth CW (2009) The elastic basis for the shape of *Borrelia burgdorferi*. *Biophys. J.* 96, 4409–4417.
- Li C, Xu H, Zhang K, Liang FT (2010) Inactivation of a putative flagellar motor switch protein FliG1 prevents *Borrelia burgdorferi* from swimming in highly viscous media and blocks its infectivity. *Mol. Microbiol.* 75, 1563–1576.
- Chen S, Beeby M, Murphy GE, Leadbetter JR et al. (2011) Structural diversity of bacterial flagellar motors. *EMBO J.* 30, 2972–2981.
- Xu H, Raddi G, Liu J, Charon NW, Li C (2011) Chemoreceptors and flagellar motors are subterminally located in close proximity at the two cell poles in spirochetes. *J. Bacteriol.* 193, 2652–2656.
<http://dx.doi.org/10.1128/JB.01530-10>
- Sze CW, Zhang K, Kariu T et al. (2012) ***Borrelia burgdorferi* needs chemotaxis to establish infection in mammals and to accomplish its enzootic cycle.** *Infection and Immunity*, **80**, 2485-2492. <http://dx.doi.org/10.1128/IAI.00145-12> <http://www.ncbi.nlm.nih.gov/pubmed/22508862>
<http://iai.asm.org/content/early/2012/04/11/IAI.00145-12> <http://iai.asm.org/content/early/2012/04/11/IAI.00145-12.full.pdf>
« Collectively, these data demonstrate that *B. burgdorferi* needs chemotaxis to establish mammalian infection and to accomplish its natural enzootic cycle. »
- Charon NW, Cockburn A, Li C, Liu J, Miller KA, Miller MR, Motaleb MA, Wolgemuth CW (2012) The unique paradigm of spirochete motility and chemotaxis. *Annu. Rev. Microbiol.* 66, 349–370.
- Radolf JD, Caimano MJ, Stevenson B, Hu LT (2012) Of ticks, mice and men: understanding the dual-host lifestyle of Lyme disease spirochetes. *Nat. Rev. Microbiol.* 10, 87–99.
- Zhang K, Liu J, Tu Y et al. (2012) Two CheW Coupling Proteins Are Essential in a Chemosensory Pathway of *Borrelia burgdorferi*. *Molecular Microbiology*, **85**, 782-794.

<http://dx.doi.org/10.1111/j.1365-2958.2012.08139.x>

Vig DK, Wolgemuth CW (2012) Swimming dynamics of the Lyme disease spirochete. Phys. Rev. Lett. 109, 218104.

Harman MW, Dunham-Ems SM, Caimano MJ, Belperron AA, Bockenstedt LK, Fu HC, Radolf JD, Wolgemuth CW (2012) The heterogenous motility of the Lyme disease spirochete in gelatin mimics dissemination through tissue. Proc. Natl. Acad. Sci. USA 109, 3059–3064.

[Duan Q](#), [Zhou M](#), [Zhu L](#), [Zhu G](#) (2012) **Flagella and bacterial pathogenicity.**
<https://doi.org/10.1002/jobm.201100335>

« **Recent evidence has pinpointed that the bacterial flagella participate in many additional processes including adhesion, biofilm formation, virulence factor secretion, and modulation of the immune system of eukaryotic cells. This mini-review summarizes data from recent studies that elucidated how flagella, as a virulence factor, contribute to bacterial pathogenicity** ».

Harman M, Vig DK, Radolf JD, Wolgemuth CW (2013) Viscous dynamics of Lyme disease and syphilis spirochetes reveal flagellar torque and drag. Biophys. J. 105, 2273–2280.

Zhao X, Zhang K, Boquoi T, Hu B et al. (2013) Cryoelectron tomography reveals the sequential assembly of bacterial flagella in *Borrelia burgdorferi*. Proc. Natl. Acad. Sci. USA 110, 14390–14395

Morimoto YV, Minamino T (2014) Structure and function of the bi-directional bacterial flagellar motor. Biomolecules 4, 217–234.

- ➔ **Virulenzinhibitoren** http://www.kabilahsystems.de/virulenz_inhibitoren.pdf
- ➔ **Zytoskelett** <http://www.xerlebnishaft.de/zytoskelett.pdf>

Der Geruch des Menschen, human body odors

Lundström JN, Olsson MJ (2010) Functional Neuronal Processing of Human Body Odors. Pheromones. Academic Press. p. 4. [ISBN 978-0-12-381516-3](#).

Preti G, Leyden JJ (2010) Genetic Influences on Human Body Odor: From Genes to the Axillae. Journal of Investigative Dermatology 130 (2), 344–346. [doi:10.1038/jid.2009.396](#). [PMID 20081888](#).

Moshkin M, Litvinova N, Litvinova EA et al. (2011) [Scent Recognition of Infected Status in Humans](#) The Journal of Sexual Medicine. 9(12), 3211-3218 DOI: 10.1111/j.1743-6109.2011.02562.x
<http://onlinelibrary.wiley.com/doi/10.1111/j.1743-6109.2011.02562.x/abstract>

- ➔ **Fettsäuren** <http://www.kabilahsystems.de/ungesaettfetts.pdf>
- ➔ **Aminosäuren und peptide** <http://www.kabilahsystems.de/biogeneamineundpeptide.pdf>
- ➔ **Cytoskelett** <http://www.xerlebnishaft.de/zytoskelett.pdf>
- ➔ **Elektromagnetische Signale** http://www.erlebnishaft.de/borrelien_direktnachweis.pdf

[Bernt - Dieter Huismans](#) Letzte Revision Juni 2019 www.Huismans.click



Back to top: <http://www.xerlebnishaft.de/chemotaxis.pdf>