Dr. Martin Schlee, PhD

Institute of Clinical Chemistry and Clinical Pharmacology

new Member since 2015

Rheinische Friedrich-Wilhelms-University Bonn, University Hospital, Institute of Clinical Chemistry and Clinical Pharmacology

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Research Expertise

The focus of Martin Schlee's research group is immune recognition and immune tolerance of viral and endogenous nucleic acids. Nucleic acid receptors of the innate immune system initiate and control the antiviral immune response of the infected organism. The detection of pathogenic RNA/DNA by nucleic acid receptors is based on recognition of unusual RNA/DNA localization, structure and modifications, so-called pattern recognition motifs. The challenge here is that the innate immune system detects sensitively pathogenic nucleic acids without false activation by the endogenous nucleic acids. While an insensitive recognition favors the spread of infection, an excessive immune detection of nucleic acids leads to autoimmune diseases. The group has identified and characterized recognition motifs of the cytosolic DNA receptor cGAS and the cytosolic RNA receptor RIG-I and endogenous as well as viral RNA modifications that prevent recognition by RIG-I.

Education / Training

University of Munich, Germany, Biochemistry, PhD, 2003
University of Bielefeld, Germany, Biochemistry, Diploma, 1999

Appointments / Positions Held

2006 - present
Group Leader, Institute of Clinical Chemistry and Clinical Pharmacology, University of Bonn, Germany

2005 - 2006
PostDoc, Division of Clinical Pharmacology, University of Munich, Germany

2003 - 2005
PostDoc, Institute of Clinical Molecular Biology and Tumor Genetics, Helmholtz Center Munich, Germany

Honors / Awards

2009
Bonfor Junior research Group award

10 Most Relevant Publications for Dr. Martin Schlee

1. Herzner AM, Hagmann CA, Goldeck M, Wolter S, Kübler K, Wittmann S, Gramberg T, Andreeva L, Hopfner KP, Mertens C, Zillinger T, Jin T, Xiao TS, Bartok E, Coch C, Ackermann D, Hornung V, Ludwig J, Barchet W, Hartmann G and **Schlee M.** Sequence-specific activation of cGAS by Y-form DNA structures as found in primary HIV-1 cDNA. Nat Immunol. 2015. 16(10):1025-33

2. Schuberth-Wagner C, Ludwig J, Bruder AK, Herzner AM, Zillinger T, Goldeck, M, Schmidt T, Schmid-Burgk L, Kerber R, Wolter S, Stümpel JP, Roth A, Bartok E, Drosten C, Coch C, Hornung V, Barchet W, Kümmerer BM, Hartmann G, **Schlee M.** A conserved histidine in the RNA sensor RIG-I controls immune tolerance to N1-2'O-methylated self RNA. Immunity. 2015. 43(1):41-51

3. Goubau D, **Schlee M***, Deddouche S, Pruijssers AJ, Zillinger T, Goldeck M, Schuberth C, Van der Veen AG, Fujimura T, Rehwinkel J, Iskarpatyoti JA, Barchet W, Ludwig J, Dermody TS, Hartmann G, Reis e Sousa C. Antiviral immunity via RIG-I-mediated recognition of RNA bearing 5'-diphosphates. Nature. 2014. 514(7522):372-5 (JIF 41.3)

4. Coch C, Lück C, Schwickart A, Putschli B, Renn M, Höller T, Barchet W, Hartmann G, **Schlee M.** A Human In Vitro Whole Blood Assay to Predict the Systemic Cytokine Response to Therapeutic Oligonucleotides Including siRNA. PLoS One. 2013. 8: e71057. doi:10.1371/journal.pone.0071057

5. Hagmann CA, Herzner AM, Abdullah Z, Zillinger T, Jakobs C, Schuberth C, Coch C, Higgins PG, Wisplinghoff H, Barchet W, Hornung V, Hartmann G, **Schlee M.** RIG-I detects triphosphorylated RNA of Listeria monocytogenes during infection in non-immune cells. PLoS One. 2013. 8(4): e62872

6. Abdullah Z, **Schlee M***, Roth S, Mraheil MA, Barchet W, Böttcher J, Hain T, Geiger S, Hayakawa Y, Fritz JH, Civril F, Hopfner K-P, Kurts C, Ruland J, Hartmann G, Chakraborty T and Knolle PA. RIG-I detects infection with live Listeria by sensing secreted bacterial nucleic acids. EMBO J. 2012. 31, 4153 – 4164.

7. Coch C, Busch N, Wimmenauer V, Hartmann E, Janke M, Abdel-Mottaleb MMA, Lamprecht A, Ludwig J, Barchet W, **Schlee M*** , Hartmann G*. Higher activation of TLR9 in plasmacytoid dendritic cells by microbial DNA compared with self-DNA based on CpG-specific recognition of phosphodiester DNA. Journal of Leukocyte Biology. 2009. 86: 663-670,

8. **Schlee M**, Roth A, Hornung V, Hagmann CA, Wimmenauer V, Barchet W, Coch C, Janke M, Mihailovic A, Wardle G, Juranek S, Kato H, Kawai T, Poeck H, Fitzgerald KA, Takeuchi O, Akira S, Tuschl T, Latz E, Ludwig J, Hartmann G. Recognition of 5' Triphosphate by RIG-I Helicase Requires Short Blunt Double-Stranded RNA as Contained in Panhandle of Negative-Strand Virus. Immunity. 2009. 31(1): 25-34

9. **Schlee M**, Hölzel M, Bernard S, Mailhammer R, Schuhmacher M, Reschke J, Eick D, Marinkovic D, Wirth T, Rosenwald A, Staudt LM, Eilers M, Baran-Marszak F, Fagard R, Feuillard J, Laux G, Bornkamm GW. C-myc activation impairs the NF-kappaB and the interferon response: implications for the pathogenesis of Burkitt's lymphoma. Int J Cancer. 2007 120(7):1387-95

10. **Schlee M**, Krug T, Gires O, Zeidler R, Hammerschmidt W, Mailhammer R, Laux G, Sauer G, Lovric J, Bornkamm GW. Identification of Epstein-Barr virus (EBV) nuclear antigen 2 (EBNA2) target proteins by proteome analysis: activation of EBNA2 in conditionally immortalized B cells reflects early events after infection of primary B cells by EBV. J Virol. 2004 78(8):3941-52