



Gunther HARTMANN, MD

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Current position

Director (W3) of the Institute of Clinical Chemistry and Clinical Pharmacology with Central Laboratory

Research expertise

The focus of research is the immunorecognition of nucleic acids, and its intersection with RNA interference. The group contributed to the immunobiology of TLR9 and CpG DNA, specifically the function of TLR9 in the human immune system. Furthermore, the group found that short interfering RNA molecules (siRNA) activate TLR7, and worked on the structural requirements for the detection of RNA by TLR7 and TLR8. The group identified the RNA ligand for RIG-I, and analyzed the signaling pathways of RIG-I, and resolved the crystal structure of RIG-I bound to its ligand 5'-triphosphate RNA. The group identified cyclic [G(2',5')pA(3',5')p] as the metazoan second messenger in the cGAS-STING pathway. The group applies immunostimulatory nucleic acids and siRNA for immunotherapy of cancer and viral infection.

Academic qualifications

2006 Degree: Experimental Pharmacology and Toxicology, LMU Munich, Germany
2003 Degree: Clinical Pharmacology, LMU Munich, Germany
1999 Habilitation, Clinical Pharmacology, LMU Munich, Germany
1994 Doctorate, Dr. med., University of Ulm, Germany
1986 - 1993 Medicine, University of Ulm, Medical School, Germany

Postgraduate professional career

2014 Founder Rigotec GmbH
2007 - pres. Director of the Institute of Clinical Chemistry and Clinical Pharmacology with Central Laboratory of the University Hospital of Bonn, Germany
2005 Professor, Head of Clinical Pharmacology, University Hospital Bonn, Germany
2004 - 2005 Chief resident, Division of Clinical Pharmacology, LMU München, Germany
1999 - 2005 Principal investigator, Division of Clinical Pharmacology, LMU Munich, Germany
1997 - 1999 Postdoctoral DFG research fellow, (Prof. Arthur Krieg), Iowa, USA
1994 - 1996 Clinical fellowship, Medizinische Klinik (Prof. P Scriba), LMU Munich, Germany

Honors and awards

2013 Elected member German National Academy of Sciences Leopoldina
2012 Gottfried-Wilhelm Leibniz-Preis
2011 - 2012 Elected President of the Oligonucleotide Therapeutics Society (OTS)
2011 Dr. Friedrich-Sasse Medal in Gold of the Berliner Medizinische Gesellschaft
2011 GoBio-Award of the Federal Ministry for Education and Research (BMBF)

Memberships and professional functions

2017 - pres. Member of the Scientific Advisory Council (SAC) of the Oligonucleotide Therapeutics Society
2016 - pres. Founder and elected head of the scientific steering committee of the Translational Infrastructure Vaccine Development (TI Vaccine) of the German Center of Infectious Diseases (DZIF)
2016 - pres. Vice Dean of Research of the Medical Faculty
2013 - pres. Vice Speaker of DZIF Bonn-Cologne
2013 - pres. Liaison lecturer of the German Academic Scholarship Foundation
2012 - pres. Speaker, ImmunoSensation Cluster of Excellence, University Bonn
2012 - pres. Head of the research committee Klinische Studien of the Medical Faculty
2011 - 2012 President of the international Oligonucleotide Therapeutics Society
2010 Elected Vice Speaker of the SFB 670
2009 Elected member of the committee Krebstherapie-Studien of the German Cancer Aid (Deutsche Krebshilfe)
2008 - 2017 Head of Research Committee BONFOR
2006 - pres. Member of the Steering committee, Comprehensive Cancer Center Köln-Bonn (CIO)

Most important funding since 2012

2016 - 2020 DFG IRTG 2168 "Myeloid antigen presenting cells and the induction of adaptive immunity"
2016 - 2018 esa "Pharmacogenetic Diagnostics for individualized medicine in Human Spaceflight"
2012 - 2017 ImmunoSensation Cluster of Excellence, Speaker
2009 - 2017 DFG SFB 832 "Molecular basis and modulation of cellular interactions in the tumour microenvironment"
2007 - 2017 DFG SFB 670 "Cell-autonomous Immunity"
2005 - 2015 BioFuture



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Publications

1. Herzner, A.M., Hagmann, C.A., Goldeck, M., Wolter, S., Kubler, K., Wittmann, S., Gramberg, T., Andreeva, L., Hopfner, K.P., Mertens, C., Zillinger, T., Jin, T., Xiao, T.S., Bartok, E., Coch, C., Ackermann, D., Hornung, V., Ludwig, J., Barchet, W., **Hartmann, G.**, and Schlee, M. (2015). Sequence-specific activation of the DNA sensor cGAS by Y-form DNA structures as found in primary HIV-1 cDNA. *Nat Immunol* 16, 1025-1033. °equal contribution
2. Schuberth-Wagner, C., Ludwig, J., Bruder, A.K., Herzner, A.M., Zillinger, T., Goldeck, M., Schmidt, T., Schmid-Burgk, J.L., Kerber, R., Wolter, S., Stumpel, J.P., Roth, A., Bartok, E., Drosten, C., Coch, C., Hornung, V., Barchet, W., Kummerer, B.M., **Hartmann, G.**, and Schlee, M. (2015). A Conserved Histidine in the RNA Sensor RIG-I Controls Immune Tolerance to N1-2'O-Methylated Self RNA. *Immunity* 43, 41-51. °equal contribution
3. Goubau, D., Schlee, M., Deddouche, S., Pruijssers, A.J., Zillinger, T., Goldeck, M., Schuberth, C., Van der Veen, A.G., Fujimura, T., Rehwinkel, J., Iskarpatyoti, J.A., Barchet, W., Ludwig, J., Dermody, T.S., **Hartmann, G.**, and Reis e Sousa, C. (2014). Antiviral immunity via RIG-I-mediated recognition of RNA bearing 5'-diphosphates. *Nature* 514, 372-375. °equal contribution
4. Gao, P., Ascano, M., Wu, Y., Barchet, W., Gaffney, B.L., Zillinger, T., Serganov, A.A., Liu, Y., Jones, R.A., **Hartmann, G.**, Tuschl, T., and Patel, D.J. (2013). Cyclic [G(2',5')pA(3',5')p] is the metazoan second messenger produced by DNA-activated cyclic GMP-AMP synthase. *Cell* 153, 1094-1107.
5. Gehrke, N., Mertens, C., Zillinger, T., Wenzel, J., Bald, T., Zahn, S., Tuting, T., **Hartmann, G.**, and Barchet, W. (2013). Oxidative damage of DNA confers resistance to cytosolic nuclease TREX1 degradation and potentiates STING-dependent immune sensing. *Immunity* 39, 482-495.
6. Wang, Y., Ludwig, J., Schuberth, C., Goldeck, M., Schlee, M., Li, H., Juranek, S., Sheng, G., Micura, R., Tuschl, T., **Hartmann, G.**, and Patel, D.J. (2010). Structural and functional insights into 5'-ppp RNA pattern recognition by the innate immune receptor RIG-I. *Nat Struct Mol Biol* 17, 781-787. °equal contribution
7. Schlee, M., Roth, A., Hornung, V., Hagmann, C.A., Wimmenauer, V., Barchet, W., Coch, C., Janke, M., Mihailovic, A., Wardle, G., Juranek, S., Kato, H., Kawai, T., Poeck, H., Fitzgerald, K.A., Takeuchi, O., Akira, S., Tuschl, T., Latz, E., Ludwig, J., and **Hartmann, G.** (2009). Recognition of 5' triphosphate by RIG-I helicase requires short blunt double-stranded RNA as contained in panhandle of negative-strand virus. *Immunity* 31, 25-34.
8. Poeck, H., Besch, R., Maihoefer, C., Renn, M., Tormo, D., Morskaya, S.S., Kirschnek, S., Gaffal, E., Landsberg, J., Hellmuth, J., Schmidt, A., Anz, D., Bscheider, M., Schwerd, T., Berking, C., Bourquin, C., Kalinke, U., Kremmer, E., Kato, H., Akira, S., Meyers, R., Hacker, G., Neuenhahn, M., Busch, D., Ruland, J., Rothenfusser, S., Prinz, M., Hornung, V., Endres, S., Tuting, T., and **Hartmann, G.** (2008). 5'-Triphosphate-siRNA: turning gene silencing and Rig-I activation against melanoma. *Nat Med* 14, 1256-1263.
9. Hornung, V., Ellegast, J., Kim, S., Brzozka, K., Jung, A., Kato, H., Poeck, H., Akira, S., Conzelmann, K.K., Schlee, M., Endres, S., and **Hartmann, G.** (2006). 5'-Triphosphate RNA is the ligand for RIG-I. *Science* 314, 994-997.
10. Hornung, V., Guenther-Biller, M., Bourquin, C., Ablasser, A., Schlee, M., Uematsu, S., Noronha, A., Manoharan, M., Akira, S., de Fougerolles, A., Endres, S., and **Hartmann, G.** (2005). Sequence-specific potent induction of IFN-alpha by short interfering RNA in plasmacytoid dendritic cells through TLR7. *Nat Med* 11, 263-270.

