

# Jun.-Prof. Dr. Niels Lemmermann

Institute of Virology



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Institute of Virology

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## Research Expertise

The host-specific cytomegaloviruses (CMV) are large DNA viruses of the beta herpesvirus family. After acute infection, CMV genomes remain in a state of replicative latency in host tissues for life, interrupted by episodes of transcriptional reactivation. The establishment of latency is the result of a long period of co-evolution between CMV and its host. During this time, the virus and host have developed a fine balance of immune evasion and immune control to maintain latency. Under conditions of immunosuppression, productive infection can occur by reactivation of the productive cycle of latent genomes. Primary infection or reactivation can lead to life-threatening diseases, e.g. interstitial pneumonia in immunocompromised patients after hematopoietic cell transplantation (HCT).

The main research topic of our group is to study the establishment of acute and latent CMV infection in a mouse model. We aim to understand the molecular and immunological basis of CMV control by the immune system and the viral countermeasures that lead to the establishment of latency.

## Education / Training

2017 University Medical Center Mainz, Germany, Habilitation (Molecular Medicine)

2009 University of Marburg, Germany, Dr. rer. physiol. (Virology)

2003 University of Marburg, Germany, Diploma (Humanbiology)

## Appointments / Positions Held

2022-current

Assistant Professor (W1ttW2), Institute of Virology, University Hospital Bonn, Germany

2011-2022

Research group leader (Immunotherapy/Molecular biology) at the Institute for Virology, University Medical Center Mainz, Germany

2009-2011

Postdoctoral fellow, Institute for Virology, University Mainz, Germany

2003-2009

PhD student, Institute for Virology, University Mainz, Germany

## Honors / Awards

2015 Registration Award of the 40th International Herpesvirus

Workshop, Boise, Idaho USA

2012 Travel Award of the 37th International Herpesvirus Workshop, Calgary CAN

2011 Travel Award of the 36th International Herpesvirus Workshop, Gdansk, Poland

2007 Travel Award of the 32th International Herpesvirus Workshop Asheville, NC USA

## 10 Most Relevant Publications

1. Kavazović I, Dimitropoulos C, Gašparini D, Rončević Filipović M, Barković I, Koster J, **Lemmermann NA**, Babić M, Cekinović Grbeša D, Wensveen FM (2023) Vaccination provides superior in vivo recall capacity of SARS-CoV-2 specific memory CD8 T cells. *Cell Rep*.
2. Gergely KM, Podlech J, Becker S, Freitag K, Krauter S, Büscher N, Holtappels R, Plachter B, Reddehase MJ, **Lemmermann NA** (2021). Therapeutic vaccination of hematopoietic cell transplantation recipients improves protective CD8 T-cell immunotherapy of cytomegalovirus infection. *Front Immunol*. 12:694588.
3. Griessl M, Renzaho A, Freitag K, Seckert CK, Reddehase MJ, **Lemmermann NA** (2021) Stochastic episodes of latent cytomegalovirus transcription drive CD8 T-cell "memory inflation" and avoid immune evasion. *Front Immunol*. 12:668885.
4. Holtappels R, Schader SI, Oettel O, Podlech J, Seckert CK, Reddehase MJ, **Lemmermann NA** (2020) Insufficient antigen presentation due to viral immune evasion explains lethal cytomegalovirus organ disease after allogeneic hematopoietic cell transplantation. *Front Cell Infect Microbiol*. 10:157.
5. Reuter S\*, **Lemmermann NA\***, Maxeiner J, Podlech J, Beckert H, Freitag K, Teschner D, Ries F, Taube C, Buhl R, Reddehase MJ, Holtappels R (2019) Coincident airway exposure to low-potency allergen and cytomegalovirus sensitizes for allergic airway disease by viral activation of migratory dendritic cells. *PLoS Pathog*. 15:e1007595.
6. Stempel M, Chan B, Juranić Lisnić V, Krmpotić A, Hartung J, Paludan SR, Füllbrunn N, **Lemmermann NA**, Brinkmann MM (2019) The herpesviral antagonist m152 reveals differential activation of STING-dependent IRF and NF- $\kappa$ B signaling and STING's dual role during MCMV infection. *EMBO J.*, 38:e100983.
7. Thomas S, Klobuch S, Podlech J, Plachter B, Hoffmann P, Renzaho A, Theobald M, Reddehase MJ\*, Herr W\*, **Lemmermann NA\*** (2015) Evaluating human T-cell therapy of cytomegalovirus organ disease in HLA-transgenic mice. *PLoS Pathog*. 2015, 11:e1005049.
8. **Lemmermann NA\***, Krmpotic A\*, Podlech J\*, Brizic I, Prager A, Adler H, Karbach A, Wu Y, Jonjic S, Reddehase MJ, Adler B (2015) Non-redundant and redundant roles of cytomegalovirus gH/gL complexes in host organ entry and intra-tissue spread. *PLoS Pathog*. 11:e1004640.
9. Becker M\*, **Lemmermann NA\***, Ebert S, Baars P, Renzaho A, Podlech J, Stassen M, Reddehase MJ (2015) Mast cells as rapid innate sensors of cytomegalovirus by TLR3/TRIF signaling-dependent and -independent mechanisms. *Cell Mol Immunol*. 12:192-201.
10. Trsan T, Busche A, Abram M, Wensveen FM, **Lemmermann NA**, Arapovic M, Babic M, Tomic A, Golemac M, Brinkmann MM, Jäger W, Oxenius A, Polic B, Krmpotic A, Messerle M, Jonjic S (2013) Superior induction and maintenance of protective CD8 T cells in mice infected with mouse cytomegalovirus vector expressing RAE-1 $\gamma$ . *Proc Natl Acad Sci USA*. 2013, 110:16550-5.

\* equal contribution