Stanford

Tobias Lanz

Assistant Professor of Medicine (Immunology and Rheumatology)

Medicine - Immunology & Rheumatology

Curriculum Vitae available Online

Bio

BIO

Tobias Lanz, MD is an Assistant Professor at the Institute for Immunity, Transplantation, and Infection and the Division of Immunology and Rheumatology at Stanford. His research focuses on B cell biology in neuroimmunological diseases and rheumatic diseases with neurological manifestations. He uses high-throughput screening technologies, and methods from structural and cell biology to identify new autoantigens and to understand how certain self-reactive B cells escape tolerance mechanisms. He is particularly interested in molecular mechanisms that explain the association between Epstein Barr Virus (EBV) and autoimmunity.

Tobias went to medical school at the Eberhard Karls University in Tübingen, Germany and at the University College of London. He wrote his MD thesis at Dr. Michael Platten's laboratory at the Hertie Institute for Clinical Brain Research in Tübingen, Germany before joining Dr. Lawrence Steinman's neuroimmunological laboratory at Stanford as a research scholar. After medical school he pursued his scientific and clinical training at the German Cancer Research Center (DKFZ) and the Department of Neurology at the University Hospital in Heidelberg, Germany. In 2015 he joined Dr. William Robinson's lab at Stanford, where he investigated environmental triggers of autoimmunity, including viruses and milk consumption. In his most recent work, he characterized the B cell repertoire in the spinal fluid of patients with multiple sclerosis (MS) and identified molecular mimicry between EBV EBNA1 and the glial cellular adhesion molecule GlialCAM as a driver of neuroinflammation (Lanz et al., Nature, 2022). His long term objective is to leverage these newly discovered mechanistic insights to develop next-generation biomarkers and therapeutics for autoimmune diseases.

ACADEMIC APPOINTMENTS

- Assistant Professor, Medicine - Immunology & Rheumatology
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- ASPIRE Award, American Association of Immunologists (AAI) (2026)
- Oppenheim Award for Multiple Sclerosis Research, Novartis (2017)
- Postdoc Scholarship, German Research Foundation (2015 - 2017)
- Carl Liebermeister Prize for outstanding medical doctoral thesis, University of Tübingen, Germany (2011)
- Postdoc Scholarship, University of Heidelberg, Germany (2010 - 2012)
- Academic Scholarship, German National Academic Foundation (Studienstiftung des Deutschen Volkes) (2007 - 2010)
- Research Scholarship, Interdisciplinary Center of Clinical Research (IZKF), University of Tübingen, Germany (2006 - 2007)
- IZKF Poster Prize, Interdisciplinary Center of Clinical Research (IZKF), Tübingen, Germany (2006)

PROFESSIONAL EDUCATION

- MD, Eberhard Karls University of Tübingen, Germany , Medicine (2010)
- Cand Med, University College of London, UK , Neurology (2009)
- Research Scholar, Stanford School of Medicine , Neuroimmunology (2008)

LINKS

- Lanz Lab Website: https://www.lanzlab.com

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Nathaniel Bloom, Evan Maestri

Orals Chair

Karsten Householder

Postdoctoral Faculty Sponsor

Alison Barrett, Frederik Bartels, Saurabh Gawde

Doctoral Dissertation Advisor (AC)

Soyeon Kim

Publications

PUBLICATIONS

- **Development of ACE2-tropic-betacoronavirus therapeutics for future pandemic preparedness.** *Nature communications*
  Utz, A., Armbrust, M., Nguyen, T. T., Morris, M. K., Matthews, C. O., Kompella, P., Cao, Z., Ha, J. W., Violette, A., Brewer, R. C., Lanz, T. V., Robinson, W. H., Xu, et al
  2025
- **Epstein-Barr virus reprograms autoreactive B cells as antigen-presenting cells in systemic lupus erythematosus.** *Science translational medicine*
  Younis, S., Moutusy, S. I., Rasouli, S., Jahanbani, S., Pandit, M., Wu, X., Acharya, S., Sharpe, O., Wijeratne, T. U., Harris, M. L., Yang, E. Y., Chaichian, Y., Parsafar, et al
  2025; 17 (824): eady0210
- **Antibodies against Myelin Proteolipid Protein (PLP) drive inflammation and demyelination in multiple sclerosis**
  Lanz, T. V.
  OXFORD UNIV PRESS.2025
- **Sequence-Independent RNA Sensing in Living Mammalian Cells.** *bioRxiv : the preprint server for biology*
  Kolber, N. S., Kaseniit, K. E., Lanz, T. V., Robinson, W. H., Gao, X. J.
  2025
- **Distinct Reactivity Patterns to EBV Nuclear Proteins and CNS Antigens Distinguish CNS Demyelinating Disorders from Systemic Autoimmunity**
  Sattarnezhad, N., Held, F., Babaei, M., Gawde, S., Ho, P., Barrett, A., Wijerante, T., Comanescu, A., Parsafar, S., Bartels, F., McDonald, J., Kipp, L., Van Haren, et al
  SAGE PUBLICATIONS LTD.2025: 309-310
- **Chimeric Antigen Receptor T Cell (CAR-T) Immunotherapy for Progressive Phenotypes of Multiple Sclerosis: early results from a Phase 1, Open-Label, Single Center Study of an Autologous Fully-Humanized Anti-CD19 CAR-T**
  Dunn, J., Tomczak, A., Galetta, K., Timmons, G., Martinez, E., Lanz, T., Manohar, M., Sahaf, B., Meyer, E., Lowsky, R.

SAGE PUBLICATIONS LTD.2025: 31

- **Predicting multiple sclerosis onset using EBV-related antibodies and machine learning methods in Swedish population**
  Liu, Y., Sattarnezhad, N., Thomas, O., Ho, P., Barrett, A., Comanescu, A., Wijerante, T., Alfredsson, L., Steinman, L., Robinson, W., Olsson, T., Lanz, T., Kockum, et al
  SAGE PUBLICATIONS LTD.2025: 885-886

- **Antibody reactivity against EBNA1 and GlialCAM differentiates multiple sclerosis patients from healthy controls.** *Proceedings of the National Academy of Sciences of the United States of America*
  Sattarnezhad, N., Kockum, I., Thomas, O. G., Liu, Y., Ho, P. P., Barrett, A. K., Comanescu, A. I., Wijeratne, T. U., Utz, P. J., Alfredsson, L., Steinman, L., Robinson, W. H., Olsson, et al
  2025; 122 (11): e2424986122

- **Connecting the dots: Presentation of EBV antigens on HLA class II risk alleles connects the two main risk factors of multiple sclerosis.** *Proceedings of the National Academy of Sciences of the United States of America*
  Lanz, T. V., Robinson, W. H.
  2024; 121 (49): e2420070121

- **Epstein-Barr virus as a potentiator of autoimmune diseases.** *Nature reviews. Rheumatology*
  Robinson, W. H., Younis, S., Love, Z. Z., Steinman, L., Lanz, T. V.
  2024

- **Identification of Autoreactive Cytotoxic T Cells in ANCA-Associated Vasculitis**
  van Dam, L., Younis, S., Moon, J., Zhang, M., Parfasar, S., Horomanski, A., Sharpe, O., van Leeuwen, J., Lanz, T., van Kooten, C., Teng, O., Robinson, W.
  WILEY.2024: 3781-3785

- **Germline-targeting immunogens guide bnAb development.** *Nature immunology*
  Lanz, T. V.
  2024

- **Anti-citrullinated protein antibodies with multiple specificities ameliorate collagen antibody-induced arthritis in a time-dependent manner.** *Arthritis & rheumatology (Hoboken, N.J.)*
  Gomez, A. M., Brewer, R. C., Moon, J. S., Acharya, S., Kongpachith, S., Wang, Q., Jahanbani, S., Wong, H. H., Lanz, T. V., Love, Z. Z., Min-Oo, G., Niedziela-Majka, A., Robinson, et al
  2023

- **Oral mucosal breaks trigger anti-citrullinated bacterial and human protein antibody responses in rheumatoid arthritis.** *Science translational medicine*
  Brewer, R. C., Lanz, T. V., Hale, C. R., Sepich-Poore, G. D., Martino, C., Swafford, A. D., Carroll, T. S., Kongpachith, S., Blum, L. K., Elliott, S. E., Blachere, N. E., Parveen, S., Fak, et al
  2023; 15 (684): eabq8476

- **Roadmap for understanding mechanisms on how Epstein-Barr virus triggers multiple sclerosis and for translating these discoveries in clinical trials.** *Clinical & translational immunology*
  Lanz, T. V., Robinson, W. H., Ho, P. P., Steinman, L.
  2023; 12 (2): e1438

- **RNA-seq characterization of histamine-releasing mast cells as potential therapeutic target of osteoarthritis.** *Clinical immunology (Orlando, Fla.)*
  Zhao, X., Younis, S., Shi, H., Hu, S., Zia, A., Wong, H. H., Elliott, E. E., Chang, T., Bloom, M. S., Zhang, W., Liu, X., Lanz, T. V., Sharpe, et al
  2022: 109117

- **Rheumatoid Arthritis Patient-derived Anti-citrullinated Protein Antibodies (ACPAs) Ameliorate Joint Inflammation in Early Collagen-antibody Induced Arthritis (CAIA)**
  Gomez, A., Brewer, C., Moon, J., Acharya, S., Lanz, T. V., Wang, Q., Min-Oo, G., Niedziela-Majka, A., Robinson, W.
  WILEY.2022: 69-70

- **SARS-CoV-2 infection of monocytes: balancing acts of antibodies and inflammasomes.** *Signal transduction and targeted therapy*
  Brewer, R. C., Robinson, W. H., Lanz, T. V.
  2022; 7 (1): 250

- **Limited Neutralization of Omicron by Antibodies from the BNT162b2 Vaccination against SARS-CoV-2.** *Research square*
  Lanz, T. V., Brewer, R. C., Jahanbani, S., Robinson, W. H.
  2022

- **Antibody cross-reactivity between casein and myelin-associated glycoprotein results in central nervous system demyelination.** *Proceedings of the National Academy of Sciences of the United States of America*
  Chunder, R., Weier, A., Maurer, H., Luber, N., Enders, M., Luber, G., Heider, T., Spitzer, A., Tacke, S., Becker-Gotot, J., Kurts, C., Iyer, R., Ho, et al
  2022; 119 (10): e2117034119

- **Clonally Expanded B Cells in Multiple Sclerosis Bind EBV EBNA1 and GlialCAM.** *Nature*
  Lanz, T. V., Brewer, R. C., Ho, P. P., Moon, J. S., Jude, K. M., Fernandez, D., Fernandes, R. A., Gomez, A. M., Nadj, G. S., Bartley, C. M., Schubert, R. D., Hawes, I. A., Vazquez, et al
  2022

- **BNT162b2 vaccine induces divergent B cell responses to SARS-CoV-2 S1 and S2** *NATURE IMMUNOLOGY*
  Brewer, R., Ramadoss, N. S., Lahey, L. J., Jahanbani, S., Robinson, W. H., Lanz, T.
  2021

- **Neutralizing Anti-Interleukin-1 Receptor-Antagonist Autoantibodies Induce Inflammatory and Fibrotic Mediators in IgG4-Related Disease.** *The Journal of allergy and clinical immunology*
  Jarrell, J. A., Baker, M. C., Perugino, C. A., Liu, H., Bloom, M. S., Maehara, T., Wong, H. H., Lanz, T., Adamska, J. Z., Kongpachith, S., Sokolove, J., Stone, J. H., Pillai, et al
  2021

- **Hypoxia Routes Tryptophan Homeostasis Towards Increased Tryptamine Production.** *Frontiers in immunology*
  Mohapatra, S. R., Sadik, A. n., Sharma, S. n., Poschet, G. n., Gegner, H. M., Lanz, T. V., Lucarelli, P. n., Klingmüller, U. n., Platten, M. n., Heiland, I. n., Opitz, C. A.
  2021; 12: 590532

- **Autoantibodies against central nervous system antigens in a subset of B cell-dominant multiple sclerosis patients.** *Proceedings of the National Academy of Sciences of the United States of America*
  Kuerten, S. n., Lanz, T. V., Lingampalli, N. n., Lahey, L. J., Kleinschnitz, C. n., Mäurer, M. n., Schroeter, M. n., Braune, S. n., Ziemssen, T. n., Ho, P. P., Robinson, W. H., Steinman, L. n.
  2020

- **CD52 Is Elevated on B cells of SLE Patients and Regulates B Cell Function.** *Frontiers in immunology*
  Bhamidipati, K. n., Silberstein, J. L., Chaichian, Y. n., Baker, M. C., Lanz, T. V., Zia, A. n., Rasheed, Y. S., Cochran, J. R., Robinson, W. H.
  2020; 11: 626820

- **Hepatocyte-intrinsic type I interferon signaling reprograms metabolism and reveals a novel compensatory mechanism of the tryptophan-kynurenine pathway in viral hepatitis.** *PLoS pathogens*
  Lercher, A. n., Popa, A. M., Viczenczova, C. n., Kosack, L. n., Klavins, K. n., Agerer, B. n., Opitz, C. A., Lanz, T. V., Platten, M. n., Bergthaler, A. n.
  2020; 16 (10): e1008973

- **Dietary tryptophan links encephalogenicity of autoreactive T cells with gut microbial ecology.** *Nature communications*
  Sonner, J. K., Keil, M., Falk-Paulsen, M., Mishra, N., Rehman, A., Kramer, M., Deumelandt, K., Rowe, J., Sanghvi, K., Wolf, L., von Landenberg, A., Wolff, H., Bharti, et al
  2019; 10 (1): 4877

- **Single-Cell High-Throughput Technologies in Cerebrospinal Fluid Research and Diagnostics.** *Frontiers in immunology*
  Lanz, T. V., Pröbstel, A. K., Mildenberger, I., Platten, M., Schirmer, L.
  2019; 10: 1302

- **Immunomodulatory receptors are differentially expressed in B and T cell subsets relevant to autoimmune disease.** *Clinical immunology (Orlando, Fla.)*
  Murphy, K. A., Bhamidiphati, K. n., Rubin, S. J., Kipp, L. n., Robinson, W. H., Lanz, T. V.
  2019: 108276

- **Suppression of Th1 differentiation by tryptophan supplementation in vivo.** *Amino acids*
  Lanz, T. V., Becker, S., Mohapatra, S. R., Opitz, C. A., Wick, W., Platten, M.
  2017

- **Tryptophan-2,3-Dioxygenase (TDO) deficiency is associated with subclinical neuroprotection in a mouse model of multiple sclerosis.** *Scientific reports*
  Lanz, T. V., Williams, S. K., Stojic, A., Iwantscheff, S., Sonner, J. K., Grabitz, C., Becker, S., Böhler, L. I., Mohapatra, S. R., Sahm, F., Küblbeck, G., Nakamura, T., Funakoshi, et al
  2017; 7: 41271

- **General control non-derepressible 2 (GCN2) in T cells controls disease progression of autoimmune neuroinflammation.** *Journal of neuroimmunology*
  Keil, M., Sonner, J. K., Lanz, T. V., Oezen, I., Bunse, T., Bittner, S., Meyer, H. V., Meuth, S. G., Wick, W., Platten, M.
  2016; 297: 117-26

- **Normal mast cell numbers in the tissues of AhR-deficient mice** *EXPERIMENTAL DERMATOLOGY*
  Pilz, C., Feyerabend, T., Sonner, J., Redaelli, C., Peter, K., Kunze, A., Haas, K., Esser, C., Schaekel, K., Wick, W., Rodewald, H., Lanz, T. V., Platten, et al
  2016; 25 (1): 62-63

- **Toxicity of teriflunomide in aryl hydrocarbon receptor deficient mice.** *Biochemical pharmacology*
  Redaelli, C., Gaffarogullari, E. C., Brune, M., Pilz, C., Becker, S., Sonner, J., Jäschke, A., Gröne, H., Wick, W., Platten, M., Lanz, T. V.
  2015; 98 (3): 484-492

- **Aryl hydrocarbon receptor control of a disease tolerance defence pathway** *NATURE*
  Bessede, A., Gargaro, M., Pallotta, M. T., Matino, D., Servillo, G., Brunacci, C., Bicciato, S., Mazza, E. M., Macchiarulo, A., Vacca, C., Iannitti, R., Tissi, L., Volpi, et al
  2014; 511 (7508): 184-?

- **Immature mesenchymal stem cell-like pericytes as mediators of immunosuppression in human malignant glioma** *JOURNAL OF NEUROIMMUNOLOGY*
  Ochs, K., Sahm, F., Opitz, C. A., Lanz, T. V., Oezen, I., Couraud, P., von Deimling, A., Wick, W., Platten, M.
  2013; 265 (1-2): 106-116

- **Clinically isolated syndrome** *NERVENARZT*
  Platten, M., Lanz, T., Bendszus, M., Diem, R.
  2013; 84 (10): 1247-1257

- **Protein kinase C beta as a therapeutic target stabilizing blood-brain barrier disruption in experimental autoimmune encephalomyelitis** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Lanz, T. V., Becker, S., Osswald, M., Bittner, S., Schuhmann, M. K., Opitz, C. A., Gaikwad, S., Wiestler, B., Litzenburger, U. M., Sahm, F., Ott, M., Iwantscheff, S., Grabitz, et al
  2013; 110 (36): 14735-14740

- **Angiotensin II sustains brain inflammation in mice via TGF-beta** *JOURNAL OF CLINICAL INVESTIGATION*
  Lanz, T. V., Ding, Z., Ho, P. P., Luo, J., Agrawal, A. N., Srinagesh, H., Axtell, R., Zhang, H., Platten, M., Wyss-Coray, T., Steinman, L.
  2010; 120 (8): 2782-2794

- **Mouse Mesenchymal Stem Cells Suppress Antigen-Specific TH Cell Immunity Independent of Indoleamine 2,3-Dioxygenase 1 (IDO1)** *STEM CELLS AND DEVELOPMENT*
  Lanz, T. V., Opitz, C. A., Ho, P. P., Agrawal, A., Lutz, C., Weller, M., Mellor, A. L., Steinman, L., Wick, W., Platten, M.
  2010; 19 (5): 657-668

- **Blocking angiotensin-converting enzyme induces potent regulatory T cells and modulates TH1-and TH17-mediated autoimmunity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Platten, M., Youssef, S., Hur, E. M., Ho, P. P., Han, M. H., Lanz, T. V., Phillips, L. K., Goldstein, M. J., Bhat, R., Raine, C. S., Sobel, R. A., Steinman, L.
  2009; 106 (35): 14948-14953

- **Toll-Like Receptor Engagement Enhances the Immunosuppressive Properties of Human Bone Marrow-Derived Mesenchymal Stem Cells by Inducing Indoleamine-2,3-dioxygenase-1 via Interferon-beta and Protein Kinase R** *STEM CELLS*
  Opitz, C. A., Litzenburger, U. M., Lutz, C., Lanz, T. V., Tritschler, I., Koeppel, A., Tolosa, E., Hoberg, M., Anderl, J., Aicher, W. K., Weller, M., Wick, W., Platten, et al
  2009; 27 (4): 909-919