

Stanford



Maximilian Koch

Postdoctoral Scholar, Stanford Cancer Institute

Bio

BIO

After I graduated from TUM medical school in 2023, I began clinical training in pediatrics under Prof. Julia Hauer at the Children's Hospital Schwabing, aiming to become a pediatric oncologist.

During my M.D. research training (Dr. med. sci.) at the Institute for Medical Microbiology, Immunology and Hygiene under the mentoring of Professors Raquel Mejias-Luque, Markus Gerhard, and Dirk H. Busch I conducted extensive research on antigen-specific CD8+ T cell responses. This experience sparked my passion for translational immunology and the therapeutic potential of T cell-based approaches.

I believe that children should benefit most from innovative therapeutic development and want to contribute by developing new and better cellular immunotherapies for pediatric malignancies. Therefore, I paused my clinical training and joined the Heitzeneder Lab at the Stanford Cancer Institute as a postdoctoral researcher.

HONORS AND AWARDS

- Early Career Investigator Award, Digestive Disease Week (April-2025)
- Walter-Benjamin-Fellowship, Deutsche Forschungsgemeinschaft (Nov-2024)
- Johannes B. Ordner Award for outstanding dissertation, Technical University Munich (Oct-2024)
- Paper of the Month, German Society for Hygiene and Microbiology (DGHM) (Apr-2023)
- M.D. Program Scholarship, German Center for Infection Research (DZIF) (Oct-2018)

PROFESSIONAL EDUCATION

- Dr. med. sci. (M.D.), Technical University Munich , Immunology (2024)
- Approbation (medical license), Technical University Munich , Medicine (2023)

STANFORD ADVISORS

- Sabine Heitzeneder, Postdoctoral Faculty Sponsor

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Cellular immunotherapies represent a novel class of treatments that harness engineered living immune cells instead of conventional synthetic drugs and have already shown remarkable clinical success. Their applications continue to expand, improving the prognosis for many diseases.

However, for some cancers outcomes remain poor, and effective immunotherapy options are still lacking.

For example, mortality rates for pediatric bone cancer such as Ewing sarcoma have not significantly improved in the past decade. Another case is T-cell acute lymphoblastic leukemia (T-ALL), which has a worse overall prognosis than B-lineage ALL and cannot be treated with current anti-CD19 CAR T-cell therapies.

To address these unmet needs, we aim to develop new cellular immunotherapies for pediatric cancers. Our approach targets both MHC-restricted epitopes and native surface antigens that are broadly expressed by malignant cells but absent from healthy tissues. We employ both T cell receptors (TCRs) and chimeric antigen receptors (CARs) to engage these targets.

To enhance safety and manufacturing precision, we use non-viral gene delivery methods such as orthotopic TCR replacement, enabling physiological receptor expression by inserting transgenes into the endogenous TCR locus. The resulting T cell products are evaluated using a range of in vitro and in vivo models and will be primed for eventual translation into clinical trials.

LAB AFFILIATIONS

- Sabine Heitzeneder, Heitzeneder Lab (11/4/2024)

Publications

PUBLICATIONS

- **Longitudinal single-cell atlas of GD2-CAR T cell therapy in H3K27M-mutant diffuse midline glioma identifies humoral and cellular anti-CAR immunity**
Chen, Y., Song, K., Desai, M. H., Huang, Y., Iswari, N., Ehlinger, Z. J., Daghigh, H., Koch, M. R., Reynolds, K., Mo, K. C., Tsui, K. C., Rietberg, S., Hamilton, et al
AMER ASSOC CANCER RESEARCH.2026
- **EPICYCLE: A confirmatory preclinical study of the anti-rhabdomyosarcoma efficacy of BET bromodomain and cyclin-dependent kinase 9 inhibitors.** *Biomedicine & pharmacotherapy = Biomedecine & pharmacotherapie*
Haller, B., Richter, G. H., Wachtel, M., Schuler, L., Regina, C., Renz, B., Jens, M., Bechtold, I., Gadasheva, Y., Hamed, E., Kisele, S., Knoblauch, M., Koch, et al
2025; 192: 118704
- **CagA-dependent Hobit+ gastric tissue-resident memory T cells confer full protection from Helicobacter pylori reinfection.** *Gut*
Gong, R., Huang, B., Ralser, A., Friedrich, V., Mibus, C., Engelsberger, V., Koch, M. R., Skerhut, M., Giese, T., Andrä, I., Vieth, M., van Gisbergen, K. P., Semper, et al
2025
- **CagA-specific Gastric CD8+ Tissue-Resident T Cells Control Helicobacter pylori During the Early Infection Phase.** *Gastroenterology*
Koch, M. R., Gong, R., Friedrich, V., Engelsberger, V., Kretschmer, L., Wanisch, A., Jarosch, S., Ralser, A., Lugen, B., Quante, M., Vieth, M., Vasapolli, R., Schulz, et al
2023; 164 (4): 550-566