Project abstract

Name of DKFZ research division/group:	***Junior Research Group Hematology and Immune Engineering (A014)***
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Group homepage: Please visit our website for further information on our research and recent publications.	***https://www.dkfz.de/en/hematology-and-immune-engineering***

PROJECT PROPOSAL

Our research group, *Hematology and Immune Engineering* at the German Cancer Research Center (DKFZ), integrates synthetic immunology, genome editing, and AI-driven bioengineering to fundamentally reprogram human immunity for cancer prevention, enhanced immune resilience, and healthy aging. We focus on translating mechanistic insights into transformative therapies that quickly impact patients, bridging basic discovery with clinical intervention. Our work spans immunological rejuvenation, precise engineering of immune effector functions, and the development of next-generation immunotherapies with first-in-human translation. The group operates within a highly interdisciplinary and clinically embedded environment, closely linked to the German Cancer Consortium (DKTK) and the Department of Hematology, Oncology and Rheumatology at Heidelberg University Hospital, and we aim for seamless integration of research and patient care.

We are seeking a **clinician scientist** to drive a project that leverages deep immune profiling, engineered cellular therapies, and predictive AI modeling to tackle tumor immune evasion in hematological malignancies. The clinician scientist will lead a translational research program focused on *immune durability and relapse prevention* in diseases such as multiple myeloma and leukemia, where current immunotherapies often fail due to adaptive resistance.
The proposed project will:

- Employ **single-cell and T-cell receptor (TCR) sequencing** to characterize determinants of durable anti-tumor immunity and identify conserved tumor targets.
- Validate **next-generation engineered immune cells** (e.g., CRISPR-optimized CAR-T cells and bispecific engager strategies) with enhanced persistence and resistance to tumor suppression.
- Together with bioinformaticians and data scientists of the lab: integrate **clinical outcome data with machine learning models** to predict patient-specific responses and tailor immunotherapeutic regimens.

Clinician scientists will be actively involved in both research and clinical protocols, co-designing early-phase trials and contributing to biomarker-driven stratification of patients. This role offers a unique opportunity to translate cutting-edge immunological discovery into actionable clinical strategies, ultimately aiming to increase long-term remission rates and prevent relapse.

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The proposed project is associated with *DKFZ Hector Cancer Institute at University Medicine Mannheim*

☐ yes

X no