

Research profile for applicants

Name of DKFZ research division/group:	Hematology & Immune Engineering (A014), HI-STEM gGmbH / DKFZ
Contact person:	Dr. med. Dr. rer. nat. Mirco J. Friedrich office-friedrich@dkfz.de
Group homepage: <i>Visit this website for further information on current research and recent publications.</i>	www.dkfz.de/en/hematology-and-immune-engineering

RESEARCH PROFILE AND PROJECT TOPICS

Research focus. The Hematology & Immune Engineering Junior Research Group (HI-STEM gGmbH / DKFZ, with a clinical home at Heidelberg University Hospital) engineers immune resilience in blood cancers. We combine synthetic immunology, genome editing and *in vivo* delivery to build T cells that recognize hidden tumor antigens, resist suppression, and persist long enough to prevent relapse. Two translational lines define the lab: CRISPR-engineered cell therapy, including PERSIST-B7H6, the first in-human trial of genome-edited CAR-T cells in Germany; and mRNA-lipid nanoparticle (LNP) delivery, where we reprogram immune and stromal cells directly in the patient rather than in the manufacturing suite. Our recent work showed that transient, organ-restricted mRNA delivery can rebuild trophic niches and rejuvenate aged immunity *in vivo* (Friedrich et al., Nature 2025), and we have established several cell-type-selective LNP delivery approaches now moving toward clinical translation.

Postdoc project: next-generation delivery chemistry for immune-targeted mRNA-LNPs. The successful candidate will build and lead the lipid chemistry arm of this program, owning the full development cycle: rational design and synthesis of novel ionizable and functionalized (phospho)lipids and helper lipids; microfluidic formulation and systematic structure-activity screening; biophysical and analytical characterization (DLS, zeta potential, cryo-TEM, HPLC/MS-based lipidomics, encapsulation and stability assays); and functional testing in primary human immune cells, with full support for *in vivo* studies in syngeneic and humanized mouse models. The aim is a defined lipid toolbox that improves potency, cell-type selectivity, tolerability and manufacturability of our platforms, developed from the outset with GMP translation, IP and regulatory requirements in mind.

We are looking for a PhD in lipid or nanoparticle chemistry, pharmaceutical technology or a related field, with hands-on formulation and characterization experience; background in bioconjugation, protein engineering or nucleic acid delivery is a plus. The position is embedded in a young, international team with state-of-the-art formulation, imaging, single-cell and GMP infrastructure, strong clinical and industry partnerships, and a real path from molecule to first-in-human application.



CONNECTING THE DOTS.
TO ADVANCE RESEARCH CAREERS

International Postdoc Program
www.dkfz.de/postdoc