

Research profile for applicants

Name of DKFZ research division/group:	<i>Pediatric Immuno-Oncology (D270)</i>
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Group homepage: <i>Visit this website for further information on current research and recent publications.</i>	<i>https://www.dkfz.de/en/pediatric-immuno-oncology</i>

RESEARCH PROFILE AND PROJECT TOPICS

The aim of our group is to improve immunotherapy of pediatric solid tumors. CAR (chimeric antigen receptor) T cells have revolutionized the treatment of pediatric leukemia/lymphoma. However, 40-60% of patients relapse after CAR T cell treatment and CARs have not been successful in most solid tumors yet. Our group leverages high-throughput genetic screens to improve cell therapies for solid tumors. Using CRISPR/Cas9, we can either knock out, activate or knock in thousands of different genes in therapeutic T cells to identify genetic modifications that can improve T cell fitness, exhaustion resistance, efficacy and invasion into the tumor. Our research thus combines the areas of immunotherapy and advanced genetic engineering with the aim to offer therapeutic options to patients with an otherwise dismal prognosis.

Example project:

For CAR T cells to achieve durable anti-tumor activity, they must eliminate multiple target cells sequentially, a process known as serial killing. Using high-throughput CRISPR screening, our goal is to determine which genetic modifications—such as specific gene overexpressions—can enhance this capacity. A major challenge has been the reliable identification of CAR T cells capable of serial killing, which we will address by integrating large-scale CRISPR screens with advanced microscopy and microfluidics platforms. This combined approach will allow us to pinpoint genetic alterations that improve CAR T cell function. This project illustrates the type of work done in our lab, where the primary focus is on CAR T cell biology (human and murine), genetic engineering, and CRISPR-based screening, with the flexibility to tailor specific projects to the candidate's interests and expertise.

We are searching for team players who are enthusiastic to explore and advance the fields of cell therapy and genetic engineering!



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