Research profile for applicants

Name of DKFZ research division/group:	*Division of Stem Cells and Cancer (A010)*
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Group homepage: *Visit this website for further information on current research and recent publications.*	*www.dkfz.de/forschung/forschungsschwerpunkte/zell-und-tumorbiologie* and *www.hi-stem.de*

RESEARCH PROFILE AND PROJECT TOPICS

Our team is dedicated to understand the biology of healthy- and cancer- stem cells. Stem cells are multi-potent and possess the ability to long-term self-renew. However, when the regulatory networks controlling these cells are disrupted, they can transform into **cancer stem cells (CSCs)**— central drivers of **tumor aggressiveness, metastasis, and resistance to therapies** (Trumpp and Haas, Cell 2022). Their ability to adapt, evade treatment, and regenerate tumors underscores a major unmet need in oncology. Our lab investigates the mechanisms that govern normal and cancer stem cells, with the goal of identifying vulnerabilities that can be therapeutically exploited to defeat cancer. **In particularly we study human Acute Myeloid Leukemia (AML)** (Raffel et al., Nature 2017; Paczulla et al., Nature 2019) **and have recently developed MAC-Scoring, which allows personalized prediction of patients to the BCL-2 inhibitor Venetoclax** (Waclawiczek et al., Cancer Discovery 2023). In addition, our research has expanded into two emerging areas: in **breast cancer**, we study **circulating tumor cells (CTCs)**—rare cells that disseminate from the primary tumor and enter the bloodstream, acting as seeds for metastasis. We explore the stem-like properties of CTCs cultured as organoids to understand their strategies to initiate metastasis (Baccelli et al., Nature Biotech. 2013; Würth et al., Nature Cancer et al., 2025). In **pancreatic cancer**, we made pioneering contributions to the **rising field of cancer neuroscience**. We developed a novel technology called **Trace-n-Seq to study the molecular networks and functional roles of individual peripheral neurons that innervate pancreatic cancer.** Our work examines how neural signaling pathways influence tumor progression and how tumors may exploit or remodel neural circuits to support their own growth and dissemination (Thiel et al., Nature 2025). These preclinical data are currently translated and examined in pancreatic patients in early clinical trials.

We perform fundamental and translational cancer research, mostly using **patient samples, using state-of-the-art technologies, including multi-omics single cell analysis,** advanced flow-cytometry and microscopy as well as preclinical functional experiments using organoid systems and mouse models. **Our long-term vision is to develop innovative approaches to fight cancer and translate this knowledge into applicable therapies for the benefit of patients**.

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