Research profile for applicants

Name of DKFZ research division/group:	***Tumor Metabolism and Microenvironment (A410)***
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Group homepage: *Visit this website for further information on current research and recent publications.*	*https://www.dkfz.de/en/tumour-metabolism-and-microenvironment*

RESEARCH PROFILE AND PROJECT TOPICS

The importance of deregulated metabolism as a hallmark of cancer is increasingly recognised. Importantly, metabolic plasticity enables cancer cells to adapt to different microenvironmental conditions and support cancer expansion and dissemination to secondary sites. Previous work from our group has identified several crucial nodes within the metabolic network that are essential for cancer cell growth and survival. We have also shown that loss of metabolic plasticity restricts the ability of cancer cells to adapt to different microenvironment, leading to reduced tumour growth. Deregulated metabolism also closely interconnects with cellular redox control, and deregulated metabolism renders cancer cells highly sensitive to induction of oxidative stress. The aim of our work is to identify mechanisms by which cancer cells adapt to different microenvironmental conditions and evade oxidative stress. We use advanced tissue culture and in vivo models coupled with molecular and biochemical analytical technologies. In particular, our group used metabolomics and stable isotope tracing to delineate essential metabolic processes in cancer cells and tissues. The proposed project will investigate the impact of metabolic plasticity on cancer cell survival and oxidative stress resistance. This investigation will identify novel molecular targets that restrict metabolic plasticity to prevent the development of metastasis and/or treatment resistance. A particular focus will be alterations in lipid metabolism that intersect with the induction of cellular stress pathways and ferroptosis. The applicant should have a strong interest in cellular metabolism and mechanisms of stress response. Knowledge of mass spectrometry, mouse models of cancer and bioinformatics are of advantage.

References:

1) Snaebjornsson, M. T. et al. Targeting aldolase A in hepatocellular carcinoma leads to imbalanced glycolysis and energy stress due to uncontrolled FBP accumulation. Nat Metab 7, 348-366 (2025).
2) Vogel, F. C. E., Chaves-Filho, A. B. & Schulze, A. Lipids as mediators of cancer progression and metastasis. Nat Cancer 5, 16-29 (2024).
3) Snaebjornsson, M. T., Janaki-Raman, S. & Schulze, A. Greasing the Wheels of the Cancer Machine: The Role of Lipid Metabolism in Cancer. Cell metabolism 31, 62-76 (2020).