

Research profile for applicants

Name of DKFZ research division/group:	Cell Signaling and Metabolism / A330
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Group homepage: <i>Visit this website for further information on current research and recent publications.</i>	https://www.dkfz.de/en/signaltransduktion-und-stoffwechsel-der-zelle/index.php

RESEARCH PROFILE AND PROJECT TOPICS

Metabolism supplies the bioenergetic and biosynthetic pathways which underlie all cellular functions. To match the metabolic demands of different physiological and pathological states, cells therefore must tightly control nutrient uptake and usage. For example, growing cells increase nutrient uptake to double in mass, whereas starving cells tap into alternative nutrient sources to survive.

Our lab investigates fundamental principles of metabolic regulation and their dysregulation in cancer. To understand how cells acquire nutrients, we characterize their import pathways. Here, we are especially interested in metabolic roles of endocytosis and the lysosome. To understand how cells switch between different nutrient acquisition strategies, we study their regulation by signal transduction. Here, we focus on the mTORC1 and Ras signaling pathways, which transduce inputs from nutrients and growth factors, to control cellular metabolic state. Dysregulated metabolism is a hallmark of cancer. Hence, we investigate how cancer cells gain metabolic autonomy to support uncontrolled growth, and promote metabolic flexibility to navigate nutrient-poor tumor microenvironments.

Within this framework, two exciting projects are available in the lab:

1. We recently discovered a novel core component of the lysosomal enzyme trafficking pathway that underlies metabolic adaptations in cancer and hereditary metabolic disorders. We now will dissect the biochemical and pathophysiological roles of this new metabolic regulator.
2. We recently discovered a novel mechanism through which lysosomal catabolic activity is switched on and off by mTORC1. We now will dissect the molecular mechanism of this new mode of lysosomal regulation and investigate its importance for cell metabolism and nutrient sensing.



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We are looking for a highly motivated postdoc who would like to address fundamental problems at the interface of metabolism, signaling and cell biology. As a basic research lab, we particularly value curiosity, creativity and the will to explore. To address our fundamental and cancer-related research questions, we combine a range of cell biological and biochemical techniques, including live imaging, proteomics and metabolite tracing. To discover new metabolic regulators, we conduct genome-wide CRISPR screens in pathophysiologically relevant metabolic environments in cell culture and in mouse models.



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