UNIVERSITÄTS-
KINDERSPITAL
ZÜRICH
*Forschungszentrum für das Kind FZK*

Pediatric Cancer Metabolism
Morscher Lab

# Master's Thesis Projects

## Pediatric Cancer Metabolism

Join the Morscher Lab at the University Children's Hospital Zurich and contribute to cutting-edge research in pediatric cancer metabolism. We have an exciting Master's Thesis positions available for a motivated student interested in biochemistry, metabolism, and cancer research.

**Project 1: Exploring Amino Acid Depletion Strategies for Therapeutic Advantage in Paediatric Leukaemia**

*Exploring amino acid metabolic vulnerabilities in acute pediatric leukemias, this project aims to expand the scope of metabolism-targeting treatments beyond asparaginase. Through high-throughput screens using cell lines and patient-derived xenografts, we will pinpoint amino acid depletion sensitivities, examining their effects using in vivo mouse models. The project will utilize drug response profiling, focusing on the role of translation inhibitors, to bolster treatment efficacy. Subsequently, we will employ LC-MS (Liquid Chromatography-Mass Spectrometry) to precisely quantify amino acid levels. Crucially, we will incorporate immunofluorescent imaging to study intracellular biology and visualize metabolic impacts . Optimal nutritional and pharmacological combinations will be pursued, leveraging shRNA for targeted gene silencing. This integrates biochemical, imaging, and molecular techniques to identify novel therapeutic strategies.*

**Project 2: Genetic determinants of anti-folate targeting drugs in solid childhood cancers**

*Osteosarcoma is the most common primary bone cancer in children and adolescents. Despite recent improvements, the treatment of relapsed/refractory and metastatic tumors remains challenging, with a 5- year survival rate below 20%. In this project, we aim to address this therapeutic challenge by identifying targetable genes involved in osteosarcoma metabolism. To address this aim, we have generated dCas9 osteosarcoma cell lines. These cell lines will be used for a genome wide CRISPRa/i screen under therapeutic pressure to identify novel candidate genes for therapy resistance. Candidates from this screen will then be more closely investigated for their mechanism of action and potential use as targets to counter drug resistance. Potential technologies for this project include CRISPR/Cas9, high-throughput automated drug screenings, cell culture, and multi-omics.*

**The Lab**

The Morscher Lab (https://www.morscherlab.org/), a multidisciplinary research group located at the University Children's Hospital in Zurich, Switzerland, is dedicated to identifying novel targets in pediatric cancer metabolism. Our ultimate goal is to develop non-genotoxic treatments that minimize long-term damage to healthy cells induced by highly toxic therapy regimens.

We accept students on a rolling basis with a duration of 9-12 months. To apply, please submit your CV and a brief letter of motivation, highlighting your previous laboratory experience or relevant practical courses. AI-generated applications will not be considered.