University of Zurich[UZH]

Department of Molecular Life Sciences

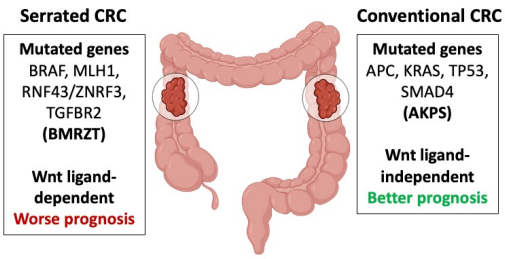
Master's thesis project

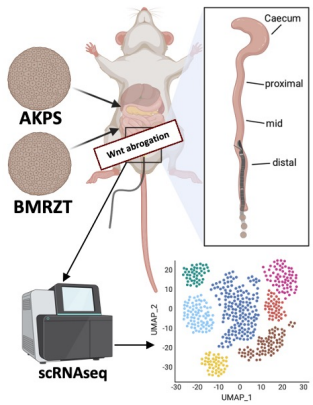
Basler lab, Irchel campus, University of Zurich

Our international team is looking for a highly motivated Master student to join us.

Title: **The role of Wnt ligands in right-sided colorectal cancer tumorigenesis**

Background: Colorectal cancer (CRC) is one of the most common malignancies and poses a major public health risk. Based on histology and primary tumor site two different subtypes can be distinguished - Conventional and serrated CRC. The two tumor entities are characterized by different mutations including members of the Wnt signalling pathway, and display distinct clinical features. Importantly, serrated CRC is considered more aggressive than conventional CRC. Currently, the mechanistic underpinnings that render serrated CRC more lethal, and the role of Wnt ligands in this context, are only poorly understood. Further research is limited by the lack of an established model. In our lab, we are developing a novel mouse model for serrated CRC based on orthotopic organoid injection. In the future this model will be employed to characterize serrated CRC by RNA sequencing, compare it to conventional CRC and to probe the requirement of Wnt ligands in the two subtypes. Overall, our research is aimed at a better understanding of the factors orchestrating serrated CRC progression which will hopefully open up new therapeutic avenues in personalized medicine.





The Master's project

Objectives and techniques

- Genomically engineer intestinal organoids using CRISPR/Cas9 to mutate driver genes found in patients
- Dissection and measurements of tumors and surrounding tissue
- Cloning and lentiviral transduction of an overexpression construct encoding Wnt inhibitors
- Analyse data from single cell / bulk RNA sequencing experiments
- Perform tissue analyses to further validate findings of the RNA-seq, including immunostaining and RNA in situ hybridization
- Perform molecular biology experiments including reporter assays, expression analyses,RT-qPCR, PCR, Westernblot, IF microscopy

Why should you do your Master's thesis with us? You will benefit from:

- Learning the concepts of cancer biology at the interface of basic and translational research
- Hands-on experience and training in a wide range of wet lab techniques including CRISPR / Organoid technology / Mouse models
- International and multidisciplinary environment with direct supervision
- Successful candidates will have the opportunity to be co-authors on high-impact publications.

Pre-requisites

- Strong interest and motivation in academic-based biology and biomedical sciences
- Solid understanding of cancer and molecular biology
- Basic knowledge of bioinformatics analyses, including R
- Ability to work independently, critical thinking & scientific curiosity

The chosen candidate will be supervised by Prof. Basler, PhD Candidate Simon Lampart and co-supervised by Dr. Hassan Fazilaty, an experienced postdoctoral fellow.

Project period: 1 year, Start before November 2024

Contact: Simon Lampart (simon.lampart2@uzh.ch), Dr. Hassan Fazilaty (hassan.fazilaty@uzh.ch), Prof. Dr. Konrad Basler (konrad.basler@mls.uzh.ch)