**HOST UNIVERSITY:** Universität Zurich

**MAIN RESEARCH FIELD (DROP-DOWN LIST):** Health and welfare

**SPECIFIED FIELD, SUBJECT:** Immunology, cancer, gastroenterology

**RESEARCH PROJECT TITLE:** The role for protein tyrosine phosphatases and epithelial-to-mesenchymal transition in the pathogenesis of inflammatory bowel disease and colorectal carcinoma.

**POSSIBLE STARTING MONTH(S):**

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**POSSIBLE DURATION IN MONTHS:**

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*Exact starting and end dates will be discussed between the supervisor and the student*

**SUITE FOR STUDENTS IN:** ☒ Master level ☐ Bachelor level

**PREREQUISITES:**
Fluid English or German speaking, interest in basic research, some experimental experience very helpful, but not prerequisite

**RESTRICTIONS:**
None

**DESCRIPTION (MAXIMUM 2,000 CHARACTERS):**
Protein tyrosine phosphatases (PTP) play a critical role in the regulation of signaling cascades involved in IBD and colorectal cancer (CRC). Particularly, PTPN23 plays a critical role in signal transduction events involved in cell differentiation, proliferation, adhesion, motility, invasion, migration, and endocytosis in mammary epithelial cells. PTPN23 deletion has recently been associated with some epithelial cancers; however, a role of PTPN23 in IBD and CRC has not been investigated yet. Nowadays therapies for IBD and CRC are often inadequate for a significant fraction of patients what clearly demonstrates the need for new treatment targets for both diseases.

Our preliminary data show that PTPN23 expression is highly increased in the epithelium of primary CRC patients compared to surrounding healthy tissue. In contrast, PTPN23 expression is restricted to immune cell infiltrates in liver and lung metastases of the same patients. *In vitro*, we found that epidermal growth factor (EGF) induces PTPN23 mRNA and protein, while siRNA-induced knock-down of PTPN23 led to an increase in cell proliferation and
migration and a decrease in apoptosis. *In vivo*, constitutively deletion of PTPN23 in intestinal epithelial cells (IECs) leads to severe diarrhea, smaller body size, elongated gut, and splenomegaly. Histologically, KO mice developed a hyperproliferative epithelium and enhanced infiltration of immune cells compared to WT littermates.

Our hypothesis is that PTPN23 controls IECs homeostasis and proliferation. The aim of this project is to investigate the role of PTPN23 in intestinal homeostasis, inflammation, and cancer, using both *in vitro* and *in vivo* techniques. To address this goal, we will study how deletion of PTPN23 affects IEC proliferation, apoptosis, and barrier function using a novel mouse models being deficient for PTPN23 specifically in IEC. Our experiments will explore the role of PTPN23 in healthy and inflamed intestine, and in the development of CRC.
**STudent REseArch Mobility Programme (STREAM)**
Research Project proposal

**Research laboratory:**
Prof. Scharl, Department of Gastroenterology and Hepatology, University Hospital Zürich

**Faculty and/or Department:**
Department of Gastroenterology and Hepatology, University Hospital Zürich, Rämistrasse 100, 8091 Zürich, Switzerland

**Deadline for nomination to reach host university:**
xxx

**Notification of admission given by the end of:**
xxx

**Additional information:**
xxx

**Contact person, including position:**
Andrea Orbann, Head of Student Mobility

**Contact email:**
andrea.orbanneche@uzh.ch