University of Basel

DBM Basel
Department of Biomedicine

MASTER THESIS PROJECT: UNCOVERING METABOLIC REGULATORS OF AML IMMUNE EVASION (APOSTOLOVA LAB)

About Us

The position is available in the Blood Cancer Biology and Immunotherapy lab, an international and interdisciplinary team bringing together physicians and life scientists with diverse backgrounds at the Department of Biomedicine of the University of Basel. Our mission is to advance the understanding of blood cancer biology and contribute to improved therapy strategies, in particular allogeneic hematopoietic stem cell transplantation. To achieve our goal, we explore how cancer and immune cell metabolism orchestrate tumor progression and the tumor-immune cell crosstalk.

More information about the research group can be found at the following links:
https://biomedizin.unibas.ch/en/research/research-groups/apostolova-lab/,
https://www.apostolovalab.com

Scientific background

Acute myeloid leukemia (AML) is an aggressive hematologic malignancy, characterized by the accumulation of immature, rapidly proliferating myeloid progenitor cells in the bone marrow. In patients at high risk of relapse, chemotherapy is frequently accompanied by an allogenic hematopoietic stem cell transplantation (allo-HSCT). The efficacy of allo-HSCT relies on the Graft-versus-Leukemia effect, a process in which donor T cells recognize and kill residual leukemic cells. Unfortunately, relapses remain frequent, occuring in about 50% of the transplanted patients. AML evasion from immune control can occur through multiple mechanisms, and accumulating evidence indicates that AML metabolism plays a critical role in this context. Leveraging a CRISPR-Cas9 knock-out screen, we have identified molecular pathways driving AML immune evasion. We are now seeking to functionally validate these candidates through in vitro and in vivo experiments.

Your Contribution

You will contribute to validating the effects of candidate metabolic pathways in AML cells and determining how silencing critical metabolic genes influences leukemia survival under immune pressure. Using viral-based CRISPR-Cas9 gene editing or small molecule inhibitors, you will genetically or pharmacologically target selected proteins in human AML cell lines. You will then assess how these interventions influence AML cell survival by co-culturing leukemic cells with healthy donor primary T lymphocytes. You will also support in vivo experiments using leukemic mouse models undergoing allogeneic transplantation.

Your profile

A dynamic and stimulating environment that promotes discussion, learning, and the development of your own ideas. You will be able to interact with experts in hematology, immunology and cell biology, and learn a wide range of state-of-the art techniques used in cancer research, including flow cytometry and cell sorting, molecular cloning, viral transduction, CRISPR-Cas9 mediated gene knockout, primary T-cell isolation, in vitro killing assays. You will work closely together with an advanced PhD student (Massimo Andreis) and be mentored by Petya Apostolova. You will receive all the support that allow you to prepare a Master thesis of high quality and impact.

When Can You Start

Starting date upon agreement.

How to Apply

Please send us an updated CV, a motivation letter and University degree records to: Massimo Andreis, PhD student (massimo.andreis@unibas.ch) and Prof. Petya Apostolova (petya.apostolova@unibas.ch).