Università della Svizzera italiana

Institute for Research in Biomedicine

PhD position in investigating novel dendritic cell subsets in respiratory immunity

The research group:
The Nobs lab investigates environment-immune interactions in human diseases using cutting-edge technologies. We utilize a variety of methodologies, which encompass advanced in-vitro experiments such as organoids, animal disease models as well as multi-OMICs, with the goal of understanding how immunity is regulated in human health and disease. The goal of our lab is to do great science and train the next generation of young scientists. The group is located at the Institute of Research for Biomedicine (IRB) in Bellinzona, Switzerland. The institute comprises a highly dynamic research environment focusing on studies of human disease, in particular for infections, inflammatory and degenerative diseases as well as cancer. In a new research building we have access to outstanding research infrastructure in a pleasant and friendly environment. Bellinzona is a picturesque Town with a high quality of life and low living costs.

Project description:
Dendritic cells are critical immune sentinel cells that initiate and drive specific immune responses. While they are important for the induction of protective adaptive immunity against pathogens, they also play a key role in mediating aberrant inflammation, including in allergic diseases. Indeed, due to their ability to promote tolerance to innocuous antigens, they are key players in shaping if and how the organism will respond to allergens and thus play an essential role in allergic diseases such as asthma. Dendritic cells consist of a heterogeneous group of cell subsets whose distinct and overlapping functions still remain not fully understood. Furthermore, how this diversity of dendritic cells is impacted by asthma and infection and how this in turn may drive detrimental lung inflammation remains not well investigated. Indeed, we have preliminary evidence that there are novel DC subsets with unknown functions. In this project, we aim to determine the identity, tissue localization, transcriptional regulators and function of lung DCs, with a focus on their role in asthma and lung viral infections. Deep transcriptomic profiling of lung DC subsets will allow the establishment of clear subset identities. This will then be leveraged with advanced bioinformatic analysis approaches to identify and validate novel lineage-defining transcription factors of lung DC subsets. Furthermore, we will use it to generate novel transgenic models to specifically target key DC subsets of interest. These new tools will then be used to elucidate

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the specific localization patterns of lung DCs as well as the function of these enigmatic cells *in vitro* and *in vivo* in the context of asthma, infection and respiratory immunity. Taken together, this project will provide fundamental insights into the diversity of lung DCs, their key regulators and how they impact lung immunity in different contexts, potentially laying the groundwork for many future studies in this field.

Who we are looking for:
- MSc or equivalent in immunology or other related backgrounds.
- High level of motivation and dedication
- Good written and oral communication skills in English
- Significant research experience
- Knowledge in immunology as well as experience in working with mouse models, and complex *in vitro* systems such as organoids is beneficial.

Start date: 01.09.2026 or according to agreement

How to apply:
Applications should be sent to Prof. Samuel Nobs at nobs.recruitment@irb.usi.ch and should include in a single PDF a detailed CV, contact information of 2-3 references, and a cover letter describing

- your main research interests incl. a brief summary of previous projects (1/2 page each)
- how your skills could be applied to our research questions
- your long-term career goals.

Applications will be evaluated until the position is filled.