

Master Degree Project at Karolinska Institutet: Role of Cholesterol-Sensing Monocytes in Lung Injury



Dr. Tim Willinger's research group studies immune responses in the lung in health and disease (<http://ki.se/en/medh/tim-willinger-group>). The research group is based in the Center for Infectious Medicine (CIM) at the Department of Medicine, Huddinge. CIM has excellent expertise in human immunology and provides a stimulating and collaborative environment.

We have an exciting project available, which will give the Master student the opportunity to participate in cutting-edge research in the field of lung immunology. The projects aim to lead to fundamental new insights that are relevant to common and important lung diseases in humans.

Project: Role of Cholesterol-Sensing Monocytes in Lung Injury

The lung is exposed to the outside world and therefore a common site of infection and chronic inflammatory diseases. Monocytes are circulating immune cells that are part of the first-line defense against infection. We will investigate the role of a new type of lung monocytes that we found to be expanded in humans with inflammatory lung disease. These monocytes express GPR183, a receptor for cholesterol metabolites (oxysterols), that regulates cell migration and inflammatory responses as we showed previously (*Immunity* 48:120, 2018). We hypothesize that GPR183-monocytes are activated in response to lung injury and contribute to tissue damage in the inflamed lung. We will test this hypothesis using mice lacking GPR183 that we generated (*Immunity* 48:120, 2018). In addition, we will probe the function of human GPR183-monocytes in our unique humanized mouse model (*Nature Biotechnology* 32:364, 2014; *Immunity* 54:259, 2021; *Journal of Experimental Medicine* 219:e20210987, 2022).

The Master student will have the opportunity to learn and apply several immunological techniques, such as purification of human hematopoietic stem cells from cord blood, isolation of immune cells from the lung, and multi-color flow cytometry. During the project, the Master student will work closely together with the group leader, a PhD student, and a lab technician. Direct work with mice is not required.

Feel free to contact the group leader for more information: tim.willinger@ki.se