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## Master's thesis project: Mucosal Immunity and Homeostasis in the Small Intestine

**Lab overview.** The Strobl lab (<https://www.medunigraz.at/en/forschungszentren-institute/otto-loewi-forschungszentrum/research/team-strobl>) investigates dendritic cell development and their importance in immune homeostasis and disease processes. The student will work in a highly collaborative environment, where to develop new personal and scientific skills. The project will also allow the candidate to interact with researchers from other fields, with the opportunity to build-up a scientific network to exploit for the rest of her/his career.

**Research project.** Intestinal epithelial cells are fundamental to maintain barrier integrity and to participate in food degradation and absorption, but they can also decipher signals coming from the outside world and 'educate' the immune system accordingly. In particular, they interact with dendritic cells (DCs) and other immune cells to drive tolerogenic responses under steady state, but they can also release immune mediators to recruit inflammatory cells and to elicit immunity to infectious agents. When these interactions are deregulated, immune disorders can develop.

Intestinal mononuclear phagocytes (lamina propria-resident CD103<sup>+</sup> dendritic cells and CX3CR1<sup>+</sup> macrophages) have collectively emerged as key players in the maintenance of gut homeostasis, the development of gut inflammation and its resolution. The aim of the project will be to provide an overview on the characteristics and function of intestinal macrophages and DCs in the small intestine, including specific roles of their subpopulations. In depth understanding of the respective activities of these cells in the mucosal landscape might pave the way for novel treatments of inflammatory disorders (like Crohn's disease or ulcerative colitis).

**Methods.** A multidisciplinary approach will be applied to develop the project, including a small intestinal *in vitro* cell culture model comprising intestinal epithelial cells (enterocytes, goblet cells, M cells) and immune cells (naïve CD34<sup>+</sup> cells and T cells), biochemical assays, flow cytometry, immunofluorescence microscopy.

**Application.** Applicants should be curious and immunology-passionate, holding a bachelor's degree in relevant fields, such as (molecular) biology, biotechnology, or biochemistry (among others). Good proficiency in English is advantageous. Previous experience in techniques such as primary cell culture and basic molecular biology techniques will be a plus. Candidates should send their application (including a curriculum vitae) by email to [christa.schimpel@medunigraz.at](mailto:christa.schimpel@medunigraz.at) to express their interest in the call and get more details about the lab's current projects.