

To all interested **master's students** looking for a

**Research internship and/or master thesis in
immunological diabetes research** at the Institute for
Diabetes Research, Helmholtz Center Munich

Dr. Maike Becker
PostDoc
+49 089 3187-4868
maike.becker@helmholtz-muenchen.de

MSc. Hannah Hipp
PhD student
+49 89 3187-1617
hannah.hipp@helmholtz-muenchen.de

November 2021

As **German Research Center for Environmental Health, Helmholtz Zentrum München** pursues the goal of developing personalized medical approaches for the prevention and therapy of major common diseases such as diabetes mellitus, lung diseases and allergy. To achieve this, it investigates the interaction of genetics, environmental factors and lifestyle. The institute for diabetes research (IDF) is part of the Helmholtz Diabetes Center (HDC) and **located in the north of Munich**. Given the dramatically rising incidence in diabetes, the projects described below aim to dissect the underlying mechanisms of diabetes development and progression, where aberrant immune activation plays a major role.

We are a young lab with a focus on immune tolerance. Our main interests are cellular mediators of immune tolerance – so-called regulatory T cells (Tregs) and how they are dysregulated in autoimmune diseases (mainly Type 1 diabetes) or in conditions of chronic inflammation as observed in obesity and Type 2 diabetes. To answer our research questions we focus on respective mouse models and we are particularly interested in T cell populations including Tregs isolated from various lymphoid and non-lymphoid tissues. Our different mouse models include diabetes models, gain- and loss-of-function models and also innovative humanized mice in order to bridge the translational gap between mouse models and the human disease.

Projects for Research Internship and/or Master Thesis

1. Targeting ROR γ t/DHODH signaling in islet autoimmunity and Type 1 Diabetes / supervised by Hannah Hipp

We investigate the influence of ROR γ t/DHODH inhibition on Tregs and different T cell subsets in islet autoimmunity and T1D. Using various *in vitro* approaches and loss-of-function or T1D mouse models, we dissect the impact on Treg induction and the underlying mechanisms. In collaboration with a biopharmaceutical company, we apply drug candidates targeting these signaling pathways *in vivo* to different mouse models for T1D to study their effect on autoimmune activation and diabetes progression or prevention.

2. The role of T cell-specific IL6R α signaling in maintaining tissue immune homeostasis / supervised by Maike Becker

We investigate the crucial role of the high-affinity α -chain of the interleukin 6 receptor (IL6R α) on CD4⁺T cells and Foxp3⁺ Tregs. Using different gain- and loss-of-function mouse models, we dissect the role of the IL6R α and its complex interplay with other signaling molecules in maintaining Tregs. By that, we investigate how the IL6R α on T cells contributes to maintaining tissue homeostasis, preventing aberrant immune activation and mediating cross-talk between tissues and immune cells which is important for the function of diabetes-relevant tissues.

General methods depend on the project but usually include:

- Multi parameter flow cytometry and cell sorting (FACS)
- Isolation of T cells from various murine tissues and/or human peripheral blood
- mRNA expression analysis from tissue and/or sorted cells by real-time qPCR
- T cell differentiation assays *in vitro*
- isolation and phenotyping of T cell subsets in tissues from mice
- ELISA for autoantibody detection in murine NOD plasma

Your qualifications:

- Highly motivated with a profound scientific interest
- Initiative, high motivation and problem-solving abilities for complex scientific questions
- Willingness to work with laboratory mice is essential (experience not required but beneficial)
- Background knowledge in Immunology is not required but beneficial
- Good communication and presenting skills in English

Our offer:

- Positive working atmosphere in a young and highly motivated scientific environment
- State-of-the-art technologies
- Training for work with laboratory animals
- Direct and interactive supervision by
- Weekly immunology meeting with scientific discussion for a broad overview of current immunological questions

For further information, please contact Hannah Hipp or Maike Becker directly.

Please send inquiries with detailed CV (focus on previous lab and method experience, combined in a single PDF) via Email to

Maike Becker, PostDoc, maike.becker@helmholtz-muenchen.de

Or

Hannah Hipp, PhD student, hannah.hipp@helmholtz-muenchen.de

Lab of **Prof. Dr. Carolin Daniel**
Immune Tolerance in Diabetes
Institute for Diabetes Research
Helmholtz Center Munich
Heidemannstr. 1, 80939 München