

## Master of Science Thesis Position in brain myeloid cell immunology

**Duration:** 9-12 months with a flexible start date

**Location:** laboratory of Prof. Dr. Melanie Greter, Institute of Experimental Immunology, University Zurich  
Supervisor: Dr. Hannah Van Hove

### **Research Topic: Unravelling the role of brain-resident macrophages in prenatal infections**

Epidemiological studies have consistently shown a strong correlation between prenatal infections in pregnant women and neurodevelopmental abnormalities in the offspring. Even without pathogen transmission, Maternal Immune Activation (MIA) is sufficient to induce local brain inflammation, but the underlying mechanisms remain incompletely understood. Recent studies have shown that the brain and in particular the border tissues such as the meninges harbor a large variety of immune cells of which macrophages are the most abundant. These myeloid cells seed the brain during early embryogenesis where they are indispensable for normal brain development. The developing and adult brain contains two main types of macrophages: microglia in parenchymal regions containing neurons and border-associated macrophages (BAM) in border tissues such as the meninges. Previous studies have shown that microglia respond to MIA and undergo transcriptional and epigenetic changes, but the lack of tools allowing specific microglia or BAM depletion have made it impossible to assess the specific roles of these two macrophage populations in the MIA etiology. The Greter lab has recently developed various tools that allow the depletion of specific brain macrophage subtypes. These tools will be used to assess how BAMs versus microglia respond to MIA and how they shape the immune landscape in the developing and adult brain.

### **Project aims:**

- Characterization of the immune landscape across brain regions in the offspring following prenatal infections.
- Determine the role of microglia versus BAMs in the response to prenatal infections by using genetic tools that allow their specific depletion.

**Techniques:** spectral flow cytometry, immunofluorescence, cytokine multiplex assays, bio-informatic analysis of flow cytometry data using R and FlowJo.

### **We offer:**

- Exciting research project addressing relevant questions in the field of neuroimmunology by making use of cutting-edge research technologies.
- Supportive environment with regular meetings and the opportunity to gain experience in presenting data.

### **Requirements:**

- High intrinsic motivation and hands-on attitude
- Good communication skills and fluency in English
- Experience in flow cytometry and histology are a plus

If interested, please send your application including a CV with a brief statement of research experiences to:

[greter@immunology.uzh.ch](mailto:greter@immunology.uzh.ch) and [vanhove@immunology.uzh.ch](mailto:vanhove@immunology.uzh.ch)

### **References**

- Han, V. X., Patel, S., Jones, H. F. & Dale, R. C. Maternal immune activation and neuroinflammation in human neurodevelopmental disorders. *Nature Reviews Neurology* (2021).
- Hayes, L. N. *et al.* Prenatal immune stress blunts microglia reactivity, impairing neurocircuitry. *Nature* (2022).
- Van Hove, H. *et al.* A single-cell atlas of mouse brain macrophages reveals unique transcriptional identities shaped by ontogeny and tissue environment. *Nat Neurosci* (2019).

